The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

VOL. II. JUNE 5, 1920 No. 51

Contents

Index to Advertisers, see page iii.

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- Abroad. Cheques, P.O.O.'s, and Postal Orders should be payable to Benn Brothers, Ltd.

Editorial & General Offices—8, Bouverie Street, London, E.C.4.
Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (4 lines).

The New President

SINCERELY as Mr. John Gray's retirement from the presidency of the Society of Chemical Industry is regretted, the Council may be congratulated on having chosen so good a successor as Sir William J. Pope. Once more the change is from the commercial to the academic type, and the more these elements are interchanged until they are welded into one entity the better for the science and the industry of chemistry. The new President, however, is no mere laboratory worker, distinguished as he is in the realm of pure science. He is essentially a man of affairs, with a wide organising and teaching experience, and with the open mind which comes from service in a variety of posts and among communities so different as those of Manchester and Cambridge. Moreover, he has a keen sense of the public as distinct from the exclusively scientific and technical point of view, and as the head of the Society of Chemical Industry his views will on this account command the interest of the public as well as that of the chemical community. The fact that so busy a man had accepted nomination to the post is a sufficient guarantee of his decision to do justice to its duties and responsibilities, and that means, in the case of Sir William Pope, at least one year of very valuable public service.

It is not at all a bad tradition, in connection with presidential honours, that each occupant should signalise and commemorate his period of office by some special work of permanent value. Sir William Pope has an exceptional opportunity in this respect. A project which he is understood to have very much at heart is the establishment of a central chemical headquarters in London—a kind of Church House, which would serve as the recognised home of all chemical interests. Sir William Pope has one essential qualification for leadership in this scheme. He has a really big idea, and the courage to preach it without qualification. The drawback of so many enterprises is that for lack of faith they are whittled down into little bits, and instead of constituting an impressive entity they become at the best no more than fragments, drawn together with hooks and eyes into something that passes for unity. As he explained in his address at the annual dinner of the Chemical Industry Club, Sir William contemplates an appeal to the united chemical interests of all classes on behalf of a central headquarters, which would be not only a worthy symbol of the size and importance of the profession, but what is even more important an active centre of inspiration and influence. A quarter of a million sterling has been mentioned as the sum required. It is certainly not too much if justice is to be done to the idea, nor is it too much for the resources of the chemical profession and industry if they can be freely brought into play. It would be a noble memorial of Sir William Pope's term of office to have such a scheme set in motion on sound lines.

This is but one example, though the largest, of the unifying influence which Sir William Pope is qualified to bring to his task. No one is more intimately familiar with the work of the various scientific societies and institutions, and this all-round knowledge should be of great advantage in promoting mutual understanding and co-ordination of interests. There is, for example, the important and pressing question of finance, to which we drew attention recently. Most of the societies are financially affected by the changed conditions wrought by the war, and some advance in subscriptions is generally recognised as necessary if their work is not to be restricted. Instead of differing degrees of advance between one society and another, resulting probably in dissatisfaction and even friction, it would be a distinct gain to have a common scale of advanced subscriptions for all scientific—certainly for all chemical—societies. These desirable understandings usually only require the right men in

charge to be arrived at quite smoothly, and Sir William Pope is singularly well qualified by experience, association and personal qualities for work of this unifying character. One may be quite sure that his abilities will be given with real devotion to the work of the Society, and with the sympathetic and loyal support of all parties we may see a forward policy of great value set in motion.

A University of Science

A MOVEMENT has been started to secure for the Imperial College of Science and Technology the status of a university, with power to grant degrees in its own subjects or faculties, and our readers will, no doubt, be interested in the case which the supporters of the movement put forward. The Imperial College was constituted in 1907 of the existing Royal College of Science (itself the successor of the Royal College of Chemistry founded in 1845), the Royal School of Mines and the City and Guilds (Engineering) College, all situated within a stone's throw of each other at South Kensington. These three institutions (while retaining certain autonomous powers) are the constituent colleges of the Imperial College of Science and Technology. By the terms of its charter the main purpose of the Imperial College is "to give the highest specialised instruction and to provide the fullest equipment for the most advanced training and research in various branches of science, especially in its application to industry," and it has power to grant diplomas but not degrees. In view of the increasing demand for scientists and technologists possessing university degrees, a large number of the students are driven to add a university degree to their college diploma. The degree most accessible to them is that of the University of London, which recognises students of the College as "internal" students of the university for the purpose of taking the "internal" degree of the university.

To some educationists, the proposal to establish in London one body empowered to grant degrees in science and technology may seem a little startling, but it is not without precedent. Zurich, Freiburg, Leipsig, Delft (Holland), and some American cities have technological institutes granting degrees. As to the question whether the Imperial College is entitled, from the educational point of view, to university rank, it is pointed out that from its charter it was clearly intended to perform real university work in science and technology, and that to raise it to university rank would be merely to recognise *de jure* the status that exists *de facto*. On the basis only of the pre-war annual expenditure, the Imperial College is stated to be as large as Manchester University, larger than Liverpool University, much larger than Birmingham and Leeds Universities, half as large again as Sheffield University, and twice as large as Bristol University or Durham with Newcastle University. Its claims in science and technology, whether viewed from the range and standard of its subjects, or from its equipment, are held to be at least as good as those of any existing university in Great Britain. There is further a definite need which the Imperial College is peculiarly marked out to fill but which it cannot meet adequately unless it has the status of a university. A large and increasing number of students from the colonies and from the overseas dominions, after completing their courses in the colonial or dominion universities and technical colleges, go to Europe or America to take up what is essentially post-graduate scientific work, especially in its application to industry. The courses of the Imperial College completely satisfy their needs in this direction, but the College, in its present status, cannot give to such colonial graduates who go through the full post-graduate courses anything more than the College diploma. On the other hand, Zurich and some American and German cities have institutes of technology granting degrees.

As to the objection that it is undesirable to have more than one university in London, it is pointed out that Greater London, with a population which may be taken as from 7,000,000 to 8,000,000, is rather a nation than a city, a nation as large as Canada, twice as large as Switzerland, half as large again as Scotland. New York and Chicago have each two universities, Washington has three, not including the Catholic university; the West Riding of Yorkshire with a population of 3,000,000 has two universities, namely those of Leeds and Sheffield; and Manchester and Liverpool, serving a combined population of 5,000,000, have each a university. In these circumstances it is reasonable for the advocates of the change to take the view that a number of separate universities would be better for London than a single university consisting of federated colleges, though there will no doubt be a strong body of academic opinion on the other side.

The Gas Engineers' Meeting

THIS week has seen in London a large gathering of gas engineers who have been holding their three days' annual meeting with Sir Dugald Clerk as president. As a journal we do not pretend to follow the gas engineer in the multitude of activities which engage his attention, for gas engineering—though certainly a chemical operation—is so diverse that it is a distinct branch of technology in itself, and is admirably catered for by the technical and trade publications, to which our readers may be referred for reports of the meeting.

Apart from the president's address probably the chief interest of the meeting lies in the special reports of the work done by the Refractory Materials Committee and the Gas Investigation Committee. Gas engineers have, perhaps, failed to appreciate the true relation of science to practice in the past, but that they are now fully aware of the advantages to be derived from an association with those of academical training is shown by the fact that the leading problems with which they are faced are now submitted to and reported upon by research chemists of high standing. The manufacture of refractories is a subject of immense importance to those in charge of gasworks, for the gaseous principle of firing now almost universally adopted is capable of yielding intense working temperatures. As yet retorts for carbonisation are made either by machinery (in which case the fireclay mixture is pressed through a die conforming with the shape required) or by hand, but during the past year experiments have been conducted for producing retorts by means of a casting process. With this method a plaster

of Paris mould is made, and the fireclay "slip," resembling a grout, is run into the mould and permitted to dry. Although the process would appear to be expensive, it is found that the article so made possesses a high degree of homogeneity, and porosity is practically constant throughout the whole body. The progress of the new method will be followed by those without the borders of the gas industry, for refractories are essential for many of the operations conducted in industrial and metallurgical chemistry.

The Gas Investigation Report is of a more specialised nature, but contains a host of data which have been compiled by Dr. A. Parker and others in connection with the economic aspects of producing town's gas by generating simultaneously a mixture of coal gas and water gas. The method is, of course, merely that of permitting a current of steam to travel through the coal during the process of carbonisation, and the perfection which the process has now reached may be gathered from the fact that from a ton of coal it is possible to obtain over 19,000 cubic feet of gas having a calorific power of some 410 B.Th.U. per cubic foot. The marked progress which has attended the scientific development of carbonisation may be gathered from the fact that to-day more than eight million British Thermal Units are obtained in the gaseous form per ton of coal, whereas at the beginning of the present century the yield was only some five and a half million units.

Chemicals and Dyestuffs

THE Dyes and Chemical Section incorporated in the current number of the *Times Trade Supplement* gives a comprehensive survey of the current conditions in these closely allied industries. Most of the space is occupied with dyes problems, and if much of the matter is already familiar to students it is none the less an advantage to have the views of authorities expressed and collected in this convenient form. Among the signed contributions we notice one on "Research as a Basic Factor," in which Dr. M. O. Forster states a convincing case in favour of co-operation between university, laboratory and factory. The articles dealing with chemicals outside the dyestuffs industry are fewer, but all good. Mr. E. J. Parry explains the position of the synthetic perfume industry in this country, and without claiming anything miraculous for the progress made, shows that at least a serious and successful start has been made. Here, as in so many other branches of chemical industry, the future really depends on our own initiative and perseverance, and if these qualities are present Mr. Parry sees no reason why the United Kingdom should not become one of the most important centres of the synthetic perfume industry. Dr. E. J. Russell writes with his usual knowledge on the increased use of chemical fertilisers in agriculture. The figures he quotes show the striking increase which has taken place in the use of sulphate of ammonia—from 60,000 tons per annum before the war to 269,000 tons in 1919. The figures relating to superphosphate reveal a stationary position, and those for nitrate of soda are incomplete, but the consumption of basic slag, which stood at 280,000 tons before the war, has nearly doubled. Among the remaining contributions may be mentioned a well-informed review of the heavy chemicals market, and a sketch of the progress made in the production of British photographic chemicals.

Sulphate of Ammonia Federation

THE objects of the new British Sulphate of Ammonia Federation are of a very comprehensive character. Not only do they cover such questions as agency, trade, import and export, and storage, but they provide for measures for promoting the use of ammonium sulphate at home and abroad, and also for supervising and financing research. The council is a representative and influential body. Membership is limited to producers of at least 10,000 tons of sulphate of ammonia a year or to representatives of firms or groups of firms producing that quantity. The constitution of the council corresponds to that of a council representing an annual production not exceeding 360,000 tons. The organization covers practically the whole country, and the different methods of production (whether by means of coke ovens, gasworks, ironworks, Mond process, shale works or otherwise) are, as far as possible, to be separately represented. The organization may be regarded as intended to protect the interests of the present producers of sulphate of ammonia, in view of the enterprises contemplated for its manufacture by the various synthetic processes, and the constitution of the first council suggests that they will be well able to safeguard their position.

The Calendar

June		
5	Royal Institution of Great Britain: "Recent Revolutions in Physical Science — (II) The Theory of Quanta," by J. H. Jeans.	Albemarle Street, Piccadilly, London.
5	The Mining Institute of Scotland: General Meeting. 3 p.m.	Heriot Watt College, Chambers Street, Edinburgh.
5	North of England Institute of Mining and Mechanical Engineers: General Meeting, 2 p.m.	Newcastle-on-Tyne.
5	North of England Institute of Mining and Mechanical Engineers: General Meeting. 2.15 p.m.	Wood Memorial Hall, Newcastle-upon-Tyne.
7	Royal Institution of Great Britain: General Meeting. 5 p.m.	21, Albemarle Street, London.
7	Royal Society of Arts: Aluminium and its Alloys, Dr. W. Rosenhain. 8 p.m.	John Street, Adelphi, London.
7	Society of Chemical Industry: Informal Meeting. 8 p.m.	Rooms of the Institute of Chemistry, 30, Russell Square, London.
8	Royal Photographic Society of Great Britain: Ordinary Meeting, 7 p.m.	35, Russell Square, London.
8	London University: "The Biochemistry of Sterols," by Dr. J. A. Gardner. 5 p.m.	Physical Laboratory, South Kensington, London.
9	Sir John Cass Technical Institute: "Factors in the Froth-Flotation of Minerals," by H. L. Sulman. 5.30 p.m.	Jewry Street, Aldgate, London.
10	Royal Society: Papers by A. V. Hill and W. Hartree; Sir James Dobbie and J. J. Fox; H. G. Cannon; E. C. Grey; L. T. Hogben.	Burlington House, Piccadilly, London.

Standardisation Movement in the United States

Special Review of Bureau of Standards' Annual Report

CONSIDERABLE attention is now being paid in this country to schemes for the provision of standard specifications for and samples of chemical substances, ores, metals, &c. The early work of Mr. Ridsdale on the preparation and distribution of standard samples of iron and steel is being further developed by the Iron and Steel Institute in conjunction with the National Physical Laboratory, and it is understood that the Institute of Metals and the National Physical Laboratory have under consideration the same problem with regard to non-ferrous metals. The question in its relation to chemical substances, ores, &c., is at present being investigated by a joint committee of the various chemical societies working under the auspices of the Society of Public Analysts, while the British Engineering Standards Association is extending its publications to cover materials used for road maintenance, timber preservation, aircraft work, &c.

In the United States the functions of these committees, together with duties undertaken by the Board of Trade, are covered by the Bureau of Standards of the Department of Commerce, and the following notes are based on the Annual Report, dated July, 1919.

The functions of the Bureau cover the development, construction, custody and maintenance of reference and working standards, and their intercomparison, improvement and application in science, engineering, industry and commerce.

The standards with which the Bureau is authorised to deal and the purpose they fulfil are set out in the table given below.

To cover the work under these five main groups, the staff is organised into divisions of measurement, of heat and thermometry, of optics, electrical division, chemical division, &c.; the chemical division takes care of purely chemical questions, and co-operates with the other divisions in questions involving chemical investigations. The purpose of the work is considered from a wide point of view. In addition to the development of correct standards of measurement, or quality or performance by scientific and technical investigation, the services of the Bureau are available for referee duties in commercial disputes relating to quality, and for advisory work relating to

Standards	Purpose
1. STANDARDS OF MEASUREMENT..... Reference and working standards for measurements of all kinds, including fundamental and derived standards of measurement for expressing the quantitative aspects of space, time, matter, energy, motion and of their interrelations. By definition, specification, or material standard, covering, for example, length, area, and volume; mass, weight, density and pressure; heat, light, electricity and radioactivity, including quantity, flux, intensity, density, &c.	To aid accuracy in industry through uniform and correct measures; To assist commerce in size standardisation of containers and products; To promote justice in daily trade through systematic inspection and regulation; To facilitate precision in science and technologic research through calibration of units, measures and instruments involved.
2. STANDARD CONSTANTS..... Natural standards or the measured numerical data as to materials and energy, known as physical or standard constants, *i.e.*, the fixed points or quantities which underlie scientific research and industrial processes when scientifically organised. Mechanical equivalent of heat, light and electricity and of gravitation; specific densities; viscosities; melting and boiling points; heat capacity; heats of combustion; velocity of propagation of light; conductivities of materials to heat and light; electrochemical and atomic weights and many similar magnitudes determined experimentally with maximum precision and referred to fundamental standards of measure.	To serve as an exact basis for scientific study, experiment, computation and design; To furnish an efficient control for industrial processes in securing reproducible and uniformly high quality in output; To secure uniformity of practice in graduating measuring instruments, compiling tables, in standards of quality and performance, and wherever uniformity is desirable; To aid laboratory research by reducing errors and uncertainty caused by use of data of doubtful accuracy.
3. STANDARDS OF QUALITY ..... Specifications for material (by description, sample or both), known as standards of quality, fixing in measurable terms a property or group of properties which determine the quality. The numerical magnitude of each constituent property pertinent to the quality involved, and specific magnitude in units of measure of such significant factors as uniformity, composition, form, structure and others.	To secure high utility in the products of industry by setting an attainable standard of quality; To furnish a scientific basis for fair dealing to avoid disputes or settle differences; To promote truthful branding and advertising by suitable standards and methods of test; To promote precision and avoid waste in science and industry by affording quality standards by which materials may be made, sold and tested.
4. STANDARDS OF PERFORMANCE ..... Specification of operative efficiency or action, for machines and devices, standards of performance, specifying the factors involved in terms susceptible of measurement. Numerical statement of speed, uniformity, output, economy, durability and other factors which together define the net efficiency of an appliance or machine.	To clarify the understanding between maker, seller, buyer and user, as to operative efficiency of appliances and machines; To make exact knowledge the basis of the buyer's choice; To stimulate and measure mechanical progress.
5. STANDARDS OF PRACTICE ..... Codes and regulations impartially analysed and formulated after study and experiment into standards of practice for technical regulation of construction, installation, operation and based upon standards of measurment, quality and performance. Collation of standard data, numerical magnitudes and ranges of the pertinent factors defining quality, safety, economy, convenience and efficiency.	To furnish for each utility a single impersonal standard of practice as a basis for agreement of all interests clearly defined in measurable terms; To insure effective design and installation of utilities of all kinds; To promote safety, efficiency and convenience in the maintenance and operation of such utilities; To secure uniformity of practice where such is practicable, and effective alternates in other cases.

the measurement of properties of materials, the collection of fundamental data for industries, and the investigation by manufacturers of new fields of investigation.

The Report serves as a useful index of the investigations carried out during the year, but for details of methods and results, reference must be made to the original published papers, or to the extracts published in the American chemical journals.

Sieves

A short note relates to the standardisation of sieve cloths. The standard scale has been revised so that the size of the openings and the diameters of the wires employed form a regular and continuous sequence from the coarser to the finer material. The ratio of the openings is $\sqrt{2}$ throughout, and the sieve is designated by a number approximately equal to the mesh per linear inch.

Weld Tests

In the electrical division attention has been given to the development of a method for the determination of the quality of welds, particularly on ship plates, without the destruction of the weld. The electrical resistance of such welds was determined, but it was found that poorly welded plates may make excellent electrical connection with each other, and consequently the resistance method has no value.

Illuminating Engineering

Numerous acceptance tests of incandescent electric lamps for Government service were carried out during the year, the inspection covering mechanical qualities, rating with regard to power consumption and efficiency and life tests. The efficiency figures for both gas-filled and vacuum tungsten lamps showed a gradual upward tendency. An illumination survey of the offices of the Department of Commerce gave an average illumination figure of about 2·5 foot candles, a figure considered to be the lowest allowable intensity for office work. It was shown that the existing level of illumination could be maintained by substituting more efficient lamps of a lower wattage, making the connected load 30 per cent. less, or that the substitution of more efficient lamps of equal wattage would make the intensity about 4 foot candles, a value more in conformity with good practice.

Electro-Chemistry

Circular 79 describes the various kinds of dry cells, the electro-chemical principles involved, and the service which may be expected from dry cells of various sizes, new apparatus and methods for the examination of such cells and cell components being developed. An extended study has been made of the methods of analysis of acid or alkaline electrolytes for storage batteries, particularly in reference to the determination of nitrates and nitrites, and other impurities, which, if present, have a deleterious effect on the storage battery. Preliminary specifications for lead-acid and iron-alkali type tractor batteries have been drawn up after measurements of capacity and efficiency under various conditions.

Gas Service

The Gas Engineering section has actively investigated standards of gas service. Questions relating to efficiency and economy of gas manufacture, distribution and utilisation of gas and investigations on the bearing of quality of coal, temperature and speed of carbonisation in by-product coking practice have been completed. Details of the experimental work on the chamber type oven are given in Technical Paper No. 134.

Under Heat and Thermometry the published work includes the following papers :—

"A Standardised Method for the Determination of Solidification Points," Scientific Paper No. 340.

"The Standardisation of the Sulphur Boiling Point," Scientific Paper No. 339.

"Fire Tests on Concrete Columns," *Proc.* Am. Concrete Institute, volts, 1919.

"Viscosity of Gasoline," Technical Paper No. 125.

Report on "Tag" Closed Flash-point Test," *Proc.* Am. Soc. for Testing Materials, Vol. XIX., 1919.

"A Comparison of the Heat Insulating Properties of some of the Materials used in Fire-resisting Construction," Technical Paper No. 130, &c.

A number of papers on pyrometry have appeared in the *Transactions* of the American Institute of Mining and Metallurgical Engineers.

The recovery of the helium content of natural gases and an examination of its properties in relation to its use as a non-inflammable gas in aircraft work received attention. Systematic surveys had shown helium to exist in such amounts as to render this hitherto rare element available in such enormous aggregate quantities as to make its use for military balloons and dirigibles perfectly feasible, if the recovery could be effected at reasonable cost.

Efflux of Gases Through Small Orifices

An important industrial method of metering natural gas requires an auxiliary determination of the specific gravity of the gas. The usual method of determining the specific gravity is dependent on the time of efflux through small orifices. This method was found to be subject to large errors. An elementary theory of viscosity and thermal conductivity of the gas upon the time of efflux was developed and applied to the observations, and shown to account for most of the observed facts. A paper under the above title, prepared in co-operation with a member of the chemical division, has been approved for publication.

Thermometric Fixed Points

The Bureau issues samples of various metals, the melting or freezing of points which have been determined with high precision on the basis of the temperature scale defined as discussed above. The demand for these standard samples has been so great that metals are now procured in ton lots when possible. One ton of lead, one ton of copper, and several hundred pounds of zinc and tin have been secured this year. This material is carefully sampled, and accurate measurements of the melting points obtained. One ton makes about 1,000 standard samples. A paper has been prepared describing the various samples issued, the chemical analyses, and the methods employed for determining the melting points.

Properties of Ammonia

An extensive series of measurements of the vapour pressure of ammonia was completed during the year. The precision obtained in these measurements was high, values being consistent to 0·01°C. or better, except at the lowest temperatures. It is believed that the results obtained are sufficient to meet the demands of engineering and scientific work for many years to come. The range of temperatures covered is from −75°C. to +70°C., which is beyond the range required in refrigeration engineering.

Spectroscopic Analysis

Spectroscopic analysis affords a rapid and accurate method of examining minerals, ores, metals, alloys, and various compounds for which a qualitative analysis is desired. In some cases it is also possible to make quantitative analyses as well. During the year the following substances have been analysed spectroscopically : Five samples of tungstic oxide, smokeless gunpowder of German and American manufacture, five samples of ores containing zirconium, six samples of barium chloride, two samples of gallium, two of tin and one of very pure magnesium wire. In addition to the above substances, whose arc or spark spectra were photographed for purposes of analysis, low-pressure tubes containing samples of "C" gas used in filling dirigible airships were made and their spectra examined. This gas was found to be chiefly helium contaminated with air.

Photography

The development of a photographic plate of the requisite speed and colour sensitiveness for spectroscopic and military use received attention, and a short reference is made to the valuable work of Sir W. J. Pope on the pinacyanol dyes. The speed of commercial panchromatic plates was found to be increased from two to four times by the use of a dilute alcoholic ammonia bath prior to using, the treatment also extending the range of sensitiveness.

A New Fixed Point on the High-Temperature Scale

The investigation of the natural rotation of light by crystalline quartz at high temperatures has developed new and unexpected phenomena. Additional knowledge of the properties of quartz is of importance from the theoretical standpoint because of its extensive use in polarimeters and other instruments and because of its relation to problems involved in the study of the history and the formation of the earth.

At a temperature of about 573°C. crystalline quartz changes its crystal form, with a transformation of energy during the

process. The discovery made by the Bureau is that the temperature at which the transformation starts when the crystal is being heated is a very definite and sharply defined one. A careful investigation has shown this point to be 573·3°C. The transformation of energy at this temperature is apparently far sharper and more easily determined than that utilised in determining the ordinary points on the high-temperature scale. It is found that a thermocouple close to but not actually in contact with a small plate of quartz will record this point with high precision. To obtain the best results the thermocouple should be inserted in a small opening in the crystal, thereby standardising it at a fixed and accurately known temperature. A study of quartz from various geographically widely distributed sources shows that the phenomenon is common to all crystalline quartz. Also the temperature of 573·3°C. is a fortunate one in that there is now in existence no known method of conveniently calibrating temperature-measuring devices in this region. Not the least important advantage is the ease with which a thermocouple can be standardised by the use of this method.

Platinum Substitutes

Two base metal alloys were examined, and were found suitable for the purposes for which they were designed. One was an alloy very resistant to nitric acid; the other could be used for electrical contact points under a limited range of conditions. Of the noble-metal alloys two were examined, known as "palau" and "rhotanium." Both are alloys of gold with relatively small amounts of palladium. These were tested in conjunction with the metallurgical division, and were found suitable substitutes for platinum in numerous operations in the chemical laboratory.

Standard Analysed Samples

The number of standard samples called for during the fiscal year 1919 was 4,944, an increase of 108 over the previous year. The distribution was as follows: Irons and steels, 3,627; brass, 93; ores, 307; sodium oxalate, 325; naphthalene, 87; benzoic acid, 108; sucrose, 95; dextrose, 16; metals for melting points, 154; cement for testing sieves, 132.

New Radiation Formula

The energy given out by a complete radiator is a complex function of the wave length and the temperature of the radiator. Many formulæ have previously been proposed to express this complicated relation. The earlier ones, due to Wien and Rayleigh, were long ago found to be only approximate, not fully representing the actual experimental facts. A formula representing the experimental data much more closely was later devised by Planck. In working over the old experimental data in connection with his colorimetric work a member of the colorimetry section has discovered an empiric relation of a form quite different from that of Planck and representing the data apparently even better than Planck's formula. The equation or formula representing this relation has been published (*Jour.* Op. Soc. of Am., January-March, 1919, and *Phys. Rev.* (2) 13, 314, 1919), and has proved to be of some interest.

Refractometer Design

A design for an improved type of Pulfrich refractometer, in which the scale is horizontal instead of vertical, as in the old type, has been worked out in the Bureau. The error of this instrument should be less than that of the German instrument, not greater than two units in the fifth decimal place, as compared with, say, one or two in the fourth for the German instrument.

An Abbé type of refractometer has been designed recently by an American manufacturer with the aid and advice of the Bureau. The Bureau made a careful examination of the preliminary model and recommended several changes. The final instrument, when actually tested, was found to be accurate to five units in the fifth decimal place, making it the most accurate of this type which the Bureau has tested.

Critical Solution Temperature Work

Experimental work is being conducted on the quantitative application of the critical solution-temperature phenomenon (1) as a criterion of the purity of chemical substances; (2) to the determination of the composition and constituents of petroleum products, especially gasoline; (3) to the determination of the quantity of water absorbed by gasoline, transformer oils and other products which dissolve small quantities of water; (4) the miscibility relations of the alcohols and hydrocarbon mixtures, such as kerosene, as bearing on the utilisation of the higher boiling hydrocarbons as internal-combustion motor fuels.

The fundamental data necessary to the application of this method to the problems listed above are the equilibrium relations in the various binary systems, showing two liquid phenomena with an upper critical solution temperature (the temperature above which two liquid layers cannot exist). Methyl alcohol, ethyl alcohol, aniline, nitrobenzene and formic acid are substances which show these phenomena with certain compounds and types of compounds forming the constituents of the lower-boiling petroleum products. The data obtained from these solubility curves are available for purity tests of different samples of the various substances involved. Methyl alcohol used in this work has been checked as to purity with pure samples of carbon disulphide. The equilibrium relations between these two substances have been determined, as well as those in the system ethyl alcohol—carbon disulphide. Several samples of commercial aniline have been tested and purified, and used in the examination of gasolines. The work is progressing mainly toward the acquisition of the fundamental data necessary preliminary to the practical application of the method to more specialised engineering or technical problems.

Determination of Physical Constants

It is aimed to provide equipment and permanent arrangements for the precise determination of some of the more commonly used physical constants, particularly those useful to organic chemists in the identification of compounds. Thus far most attention has been paid to freezing-point determinations of mixtures as well as single substances; for instance, of various samples of motor fuels. It is expected to extend the work to the determination of boiling points, refractive indices and densities.

Further notes in the report warrant reference to the original papers; one may refer in particular to the description of a simple sensitive apparatus for the automatic analysis of gases, and to some of the work published by the Glass, Refractories and Metallurgical sections.

During the year the Bureau issued 53 publications, 36 of which were new and 15 revised editions. Forty publications were reprinted without revision.

Staff

During the year the Bureau staff comprised 341 statutory employees and about 809 engaged in research and investigations specially authorised by Congress. The statutory positions included 201 scientific positions, 52 office assistants, 55 engaged in the operation of the plant, and 33 on construction work. In addition to the above, there were 300 employees detailed from other Government departments and organisations during the year for work in the Bureau. The Bureau more than doubled its force during the war.

Attention is drawn to the inadequate salaries of the scientific and technical experts in the service of the Department. Over 80 per cent. of the regularly appointed employees left the Department during the year, a rate of change sufficient to have a material effect upon the efficiency of the work.

F.M.P.

Recent Wills

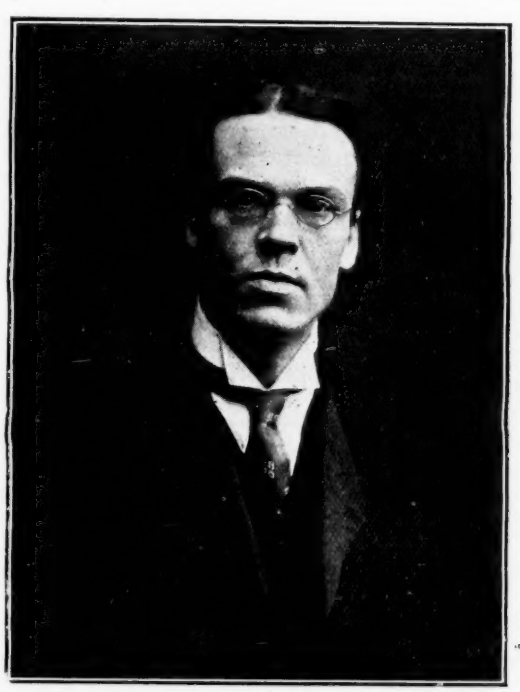
Professor L. T. O'Shea, of 395, Fulwood Road, Sheffield, for many years Professor of Applied Chemistry at Sheffield University (net personalty, £4,842)	£4,964
Mr. G. H. Holdroyd, of 72, West End Avenue, Harrogate, Yorks., formerly a director of Clayton, Holdroyd & Co., Ltd., manufacturing chemists (net personalty, £3,526)	£5,616
Mr. F. Horsell, of Moor Allerton, Leeds, head of F. Horsell & Co., Ltd., printer's ink manufacturers	£39,536
Mr. E. G. L. Marsden, of Flixton, Lancs., chemist	£4,013
Mr. D. Goyder, M.D., L.R.C.S.E., of Bradford, who started life in Glasgow as a chemist, one of the founders of the Bradford Medico-Chirurgical Society. (Net personalty, £9,563)	£12,295

Society of Chemical Industry

Sir W. J. Pope Nominated President

In connection with the forthcoming annual meeting of the Society of Chemical Industry to be held in the Armstrong College, Newcastle-on-Tyne, beginning on July 13, Sir W. J. Pope has been nominated president. Mr. John Gray, the retiring president, Mr. D. Lloyd Howard, Dr. Stephen Miall and Mr. E. Thompson have been nominated vice-presidents. Mr. E. V. Evans and Professor Henry Louis have been elected honorary treasurer and honorary foreign secretary in place respectively of Mr. D. Lloyd Howard (resigned) and the late Dr. R. Messel; and Dr. T. Howard Butler, Mr. F. H. Carr, Mr. W. H. Coleman, Professor C. H. Desch, and Captain C. J. Goodwin have been nominated to fill four vacancies among the ordinary members of the Council.

Since this announcement was made we learn that Sir William Pope has accepted the Council's nomination to the post of President, and as, of course, no other candidate is nominated, his election is assured. As his record shows, Sir William has had a varied and extensive experience. Born in London in 1870, he was educated at Finsbury Technical



Russell & Co.

PROFESSOR SIR W. J. POPE.

College and at the Central Technical College, London. After serving four years as head of the Chemistry Department at the Goldsmiths' Institute, he left London for Manchester in 1901 to take up the post of Professor of Chemistry and Head of the Chemistry Department at the Municipal College of Technology. Four years later he was also appointed Professor of Chemistry in the University of Manchester. These appointments he held until 1908, when he became Professor of Chemistry at Cambridge University, which appointment he still holds.

Outside his academical career Sir William has held many distinguished positions. In 1914 he acted as president of Section B of the British Association for the Advancement of Science; in 1915 he was made a member of the Panel of Consultants of Lord Fisher's Admiralty Inventions Board. He is an Honorary Fellow of the Royal Photographic Society, and from 1917 to 1919 was President of the Chemical Society. He was awarded the Longstaff medal of the Chemical Society in 1903 and the Davy Medal of the Royal Society in 1914.

As an author he is well known for his contributions on organic chemistry and crystallography to scientific journals. He was the discoverer of the optical activity due to asymmetry of the nitrogen, sulphur, selenium, and tin atoms; and the discoverer with W. Barlow of the relation between crystalline form and chemical constitution. In 1900 he delivered the Cantor Lecture of the Society of Arts on "The Bearings of Geometry on the Chemistry of Fermentation."

For services rendered in connection with the war Sir William was created in 1919 a Knight of the British Empire, and his distinctions include the following: F.R.S., F.I.C., F.C.S., M.R.I., F.C.G.I., M.A. (Cantab), M.Sc., Tech. (Manc.), LL.D. (St. Andrews), D.Sc. (Melb.), Fellow of Sydney Sussex College, Cambridge.

To the many qualifications enumerated Sir William Pope adds the pleasantest personal qualities. He is a practised public speaker, with a dry gift of humour, and he seems to adapt himself equally well to the severities of research work, to his classroom lectures, to an after-dinner speech, or to an official address from the platform or the chair of some scientific society.

British Oil Policy

SIR AUCKLAND GEDDES, in his speech at the Pilgrims' Club banquet in New York last week, denied the alleged exclusion of all foreigners from the exploitation of oil on British territories, and stated that "this was only true of the British Isles, because the oil there was nationalised, but of little importance, as practically no oil was there." Some misunderstanding has arisen, as to the meaning of Sir A. Geddes's remarks, and the following accurate statement has been published:—

"The statement that oil in the British Isles is nationalised is not accurate in the strictest acceptation of the term, for, although it is the declared policy of the Government to nationalise the British oil supply, the Bill for that purpose has not been introduced into Parliament. On the other hand, the Petroleum Production Act of 1918 enacted that 'no person other than a person acting on behalf of his Majesty or holding a licence for the purpose shall bore for or get petroleum within the United Kingdom.'

"This action was taken by the Government on expert advice, in order to prevent mistakes and the general chaotic conditions which were created years ago in America owing to indiscriminate and competitive drilling.

"What Sir Auckland doubtless wished to convey to his American auditors was that the British Government had decided that oil in this country would be primarily the property of the State and not, as in the case of coal, the property of the landlords.

"We understand that the Government action does not imply that foreign capital should not be used to develop the home oil supplies. As a matter of fact, it is highly probable that a certain amount of foreign money and experience will be forthcoming for that purpose.

"With regard to the oil situation in Mesopotamia, at least three great oil groups are manœuvring for position, and there are other powerful influences at work behind the scenes. If decision is delayed, it must be attributed to design, for enormous pressure is being brought to bear to secure one speedily. The Government have recently reiterated their assurances to their friends abroad, that they will be no party to monopoly, home or foreign. Their policy will be what they deem to be in the best interests of Mesopotamia and the British Empire, not forgetting the taxpayer.

"The whole world stands in need of cheaper petrol, and it is stated that the Cabinet regard it as vital that the Empire should be in a position to secure cheap oil as speedily as possible. At the same time, the immense services rendered by American oil to the Allied cause during the war are not forgotten, and the policy of the open door will be maintained in its essential features.

"Meanwhile, people are coming forward with claims for concessions granted by the Turkish Government, and these are being very closely investigated."

Book Received

REPORTS OF THE PROGRESS OF APPLIED CHEMISTRY. Vol. IV., 1919. Society of Chemical Industry, London. 12s. 6d. (5s. 6d. to members). Pp. 632.

Manchester College of Technology

A Good Record of War Research

So much valuable work done in our scientific institutions during the war still remains undisclosed that the short record which has just been made public of the researches in applied chemistry undertaken by the Manchester College of Technology is to be welcomed. To begin with, Professor E. Knecht, Associate Professor of Technological Chemistry in conjunction with Miss Hibbert, perfected a method of analysis of nitro compounds, including high explosives, by means of titanous chloride, which was used in many works, including at least one high-explosive factory. Professor Knecht (in collaboration with Dr. Coward, formerly Lecturer in Physical Chemistry, and Mr. Peachey, Lecturer on the Chemistry of Rubber), also carried out an extensive series of experiments with a view of determining the best methods of manufacturing tri-nitrotoluene and picric acid. Certain physical constants of tri-nitrotoluene were determined in the course of these experiments.

Dr. Coward conducted investigations, at the request of the War Office, with a view to the adoption of Burrell and Robertson's method of estimating the amount of toluene and benzene in coal gas. He succeeded in developing a process by which results which had previously required three days to obtain are now secured in 17 minutes. This process was adopted in several of the large gas works which supplied toluene and benzene to the Government.

Mr. L. Guy Radcliffe, Lecturer in Organic Chemistry, carried out researches on high explosives, and discovered an allotropic form of symmetric trinitrobenzol. At the request of the U.S. Government the Department of Explosives Supplies forwarded a copy of these results to America. At the request of the Royal Society, a number of technology students, working under the direction of Mr. Radcliffe, produced certain pharmaceutical drugs to meet the deficiency that arose in the early days of the war. Mr. Radcliffe was co-opted a member of the Insulating Oils Sub-Committee of the Institution of Electrical Engineers, and has been conducting researches on insulating oils for transformers, &c. The results of these researches have been reported to the Institution, and the work is still in progress.

Mr. S. J. Peachey prepared and patented a new rubber product, "Duroprene," samples of which were supplied to the Air Board and the Trench Warfare Department for experimental purposes. He also discovered a new accelerator for the vulcanising of rubber, by means of which the time required for the operation is reduced by two-thirds.

Metallurgy

At the request of the Ministry of Munitions, Mr. E. L. Rhead, Head of the Sub-Department of Metallurgy, investigated methods for treating the brass of spent small arms cartridge cases so as to render the brass capable of being rolled and drawn, with the result that it may be used repeatedly for the manufacture of cartridge cases. A satisfactory method of treating the brass was discovered, so that the material of used cartridge cases approximately doubled in value. In view of the high and increasing price of Admiralty gunmetal (88 copper, 10 tin, 2 zinc), a firm of engineers and brass founders approached Mr. Rhead with a view to obtaining a cheaper substitute capable of fulfilling Admiralty requirements. He was able to supply this firm with a satisfactory alloy costing only about 75 per cent. of the cost of the Admiralty alloys. The use of this alloy effected a considerable saving in copper and tin. For another firm requiring a substitute for aluminium in gas masks, the aluminium having proved unsatisfactory, Mr. Rhead produced a suitable white malleable alloy capable of resisting corrosion.

Mr. Rhead was able to give valuable help to many firms producing munitions of war. He advised on the methods of manufacture of aluminium powders, which had not been previously manufactured in this country. He examined the corrosion of nitrating pans and other vessels extensively used in chemical works, and was able to show that the presence of phosphorus in the cast-iron from which the vessels were made was the source of this trouble. From the results of other experiments which he carried out he was able to produce a cast-iron of high tensile strength. This cast-iron was subsequently used in the manufacture of cast-iron gas shells. On account of the high tensile strength of the cast-iron these shells were able to be projected to a greater distance than those previously manufactured. It is estimated that the effective range was approximately doubled. He also examined the cast-iron of some fuse bodies which manufacturers had found difficulty in machining. He was able to show that the difficulty was caused by the presence of small, hard pellets due to excess of phosphorus in the cast iron.

Dyestuffs Research

With a view to assisting the development of the dyestuffs industry, a new laboratory for advanced study and research on intermediate coal-tar products and dyestuffs was opened in the College of Technology in September, 1916. Professor A. G. Green, F.R.S., held the post of director for two years, and, with the assistance of Mr. F. M. Rowe and others, undertook research in this laboratory during 1917. The Committee of the Privy Council for Scientific and Industrial Research took considerable interest in this new development of the work of the college—the first department of the college to be established specifically for post-graduate study and research.

Aeroplane Dopes

In 1916 the Board of Inventions and Research requested Mr. J. Huebner, Head of the Sub-Department of Bleaching, Dyeing and Printing, to investigate the manufacture of dopes for aeroplanes without the use of acetone. Mr. Huebner undertook the investigation and discovered a new method of producing dopes. The invention was patented and was placed unconditionally at the disposal of the Admiralty. The Admiralty wrote on May 28, 1917, expressing their appreciation of the offer. Early in 1918 Mr. Huebner accepted an invitation of the Controller of Munitions Inventions, Ministry of Munitions, to become a corresponding member of the Chemical Waste Products Committee. He was asked by this committee to carry out research on the utilisation of waste mimosa bark and Scotch wood waste in the manufacture of paper. The Ministry appointed Lieut. Walshaw, a former student of the College, to assist in this work. As a result of the investigation useful wrapping papers were produced on the college experimental paper-making plant. Early in 1919 Mr. Huebner was asked by the Admiralty to supervise the final doping of rigid airships. He produced a special dope for this purpose which was applied to H.M. R. 34, R. 33 and R. 32, prior to their long-distance flights.

Institution of Inventors

Speaking at a recent meeting of the INSTITUTE OF INVENTORS Dr. Alfred Reay remarked that, in dealing with questions relating to the granting of patents in this country, one of the great difficulties had always been that we had had as advisers lawyers and patent agents who had been mainly interested in inventions relating to engineering rather than to chemicals. He felt that patents relating to chemicals ought to be dealt with separately. Most of the difficulties with which British chemical manufacturers had to deal were due to the fact that so few chemists had been consulted in the framing of patent legislation.

Asphyxiation by Benzol Fumes

The story of plucky attempts to rescue a man who was asphyxiated by fumes in a benzol tank was related at a Kingston-on-Thames inquest last week. Two men named F. H. Walker, of Putney, and A. Waterman, of Kingston, were cleaning out the tank at the Kingston depot of the Anglo-American Oil Co., when Walker was overcome by fumes and began to stagger about the tank. Waterman went to his assistance, and attempted to carry him up a ladder out of the tank, but was also rendered unconscious. He was eventually rescued by means of a hook and rope, and artificial respiration in the case of Waterman by Dr. Armstrong proved successful. The doctor then tied a wet towel around his mouth, and descended into the tank, proceeding to tie a rope around Walker's legs. Walker was alive when rescued, but he died within a few minutes. The jury, in returning a verdict of accidental death, commended Dr. Armstrong and Waterman for their heroic efforts to rescue the man. Mr. Frampton, who appeared for the company, pointed out that the cleaning of the tank should not have been done by the workmen at Kingston, as the company staffed properly trained men for the purpose. (See *Chemical Age*, pp. 346, 375, 426.)

Sulphate of Ammonia Federation

Organisation of Large Manufacturers

THE British Sulphate of Ammonia Federation, Ltd., has been registered as a company limited by guarantee, the objects of which are to act as agents for, to deal in, import, export and dispose of, provide storage accommodation for, store, promote the use at home and abroad (by advertisement or other methods of propaganda), and keep in touch with the progress made in the knowledge and practice of making sulphate of ammonia; to supervise and finance research undertaken in the interest of the production and use thereof, &c. The Federation being a non-profit association, the funds and property are to be applied solely towards the promotion of its objects. The management is vested in a council, the first members of which include F. Wooley-Hart, 11-12, Pall-Mall, S.W.; W. Kay, J.P., Manchester Corporation gas department; J. E. Barlow, Miles Platting, Manchester, director of Hardman & Holden, Ltd.; P. M. Ritchie, 1, Dixon Street, Glasgow, managing director of William Dixon, Ltd.; A. W. Smith, general manager of Birmingham gas department; E. E. Barnes, director of Hasland Colliery Co., Ltd.; R. D. McCowan, managing director of Harington Coke Ovens, Ltd.; B. Talbot, Middlesbrough, director of the Cargo Fleet Iron Co., Ltd.; H. C. Head, Winchester, managing director of the Winchester Water & Gas Co.; E. J. George, Consett, co. Durham, managing director of the Consett Iron Co., Ltd.; R. Halkett, general manager of Sheffield Gas Co.; R. C. Miller, commercial manager of Scottish Oils, Ltd.; A. Read, secretary of Bolckow, Vaughan & Co.; W. L. Johnson, director of Bell Bros., Ltd.; B. Sadler, director of Sir S. A. Sadler, Ltd.; T. P. Ridley, secretary of the Newcastle & Gateshead Gas Co.; D. M. Watson, governor of the Gas Light & Coke Co.

A member of the council must be a British subject, and either (1) a producer in the preceding year of at least 10,000 tons of sulphate of ammonia; or (2) a representative of a company, firm or public corporation or group of companies, firms or public corporations whose aggregate production in the preceding year amounts to at least 10,000 tons of sulphate of ammonia; or (3) a representative of a group of companies, firms or corporations in one of the districts mentioned below, or using one of the methods named below, who would be excluded from membership by reason of their aggregate production in the preceding year being less than 10,000 tons.

Each of the following districts shall be separately represented on the council, and shall be entitled to one representative for each complete 10,000 tons of sulphate of ammonia produced in that district in the preceding year by members and public corporations carrying on business therein: (1) Scotland; (2) Northumberland, Durham and North Riding of Yorkshire; (3) Cumberland, Westmorland and Isle of Man; (4) Lancashire, Cheshire, North Wales and Ireland; (5) Yorkshire (except North Riding), Lincolnshire, Derbyshire, Leicestershire, Northamptonshire, Nottinghamshire and Rutlandshire; (6) Staffordshire, Shropshire, Warwickshire, Worcestershire, Herefordshire and Gloucestershire; (7) South Wales and Monmouthshire; and (8) the counties lying to the south of a line drawn from The Wash to Bristol, other than those specified above. The different methods of production (whether by means of coke ovens, gasworks, ironworks, Mond process, shale works or otherwise) shall, as far as may be practicable, be separately represented on the council.

The constitution of the council corresponds to that of a council representing an annual production not exceeding 360,000 tons of sulphate of ammonia. In the event of the annual production of the members of the Federation, or public corporation which shall have entered into an agreement with the Federation, increasing beyond 360,000 tons, a proportionate increase shall be made in the quota of 10,000 tons as qualifying for membership of the council, the quota being increased in respect of each 50,000 tons per annum of further production, but so as to limit to a maximum of 40 the number of members serving on the council.

The secretary of the new Association is Mr. H. Jones, and the solicitor Mr. F. M. Guedalla, Winchester House, Old Broad Street, E.C. The registered office is at 30, Grosvenor Gardens, S.W.1.

The offices of the CYPRUS OIL TRUST, LTD., have been transferred to 62, London Wall, London, E.C.

Potash Exports and Prices

IN the House of Commons on Tuesday Sir R. Cooper asked the President of the Board of Trade on what date was the price of sulphate of potash first fixed by the Government; what were those prices in Hamburg, Rotterdam, or British ports; on what dates were alterations made in those prices; what were those prices, and was the price controlled by the Government to-day; what quantity of sulphate of potash out of the 40,000 tons contracted for last year with the German Government was licensed for export to the United States, and on what date was the above contract signed; what were the total exports of sulphate of potash and of muriate of potash from the United Kingdom during the last four months of 1919 and the first four months of 1920; and what amounts of each of these chemicals were exported during those periods to the United States?

Mr. Bridgeman, who replied, gave the following information:

1. The price of sulphate of potash for sale in the United Kingdom was first fixed by the Government on August 20, 1919.

2. The maximum prices fixed were: *ex* ship British port, £22. 7s. 6d.; delivered at nearest railway station, £23. 2s. 6d. In November, 1919, the latter price was advanced to £23. 7s. 6d.

3. The price is controlled by the Government to-day.

4. The total quantity of sulphate of potash contracted for was 13,250 of salts (not 40,000 tons), and none of this was licensed for export to the United States.

5. The contract with the German Government was formally signed on behalf of the British Government on July 1, 1919, but the heads of agreement had actually been signed in the preceding March.

6. The total exports of sulphate and muriate of potash from the United Kingdom during the last four months of 1919 and the first four months of 1920 were: Sulphate of potash, 447 tons 16 cwt.; muriate of potash, nil; and none of either commodity was exported from the United Kingdom to the United States during the period named.

Out of the material delivered under the German contract, 4,631 tons of sulphate and 12,304 tons of muriate of potash were sold for shipment direct from Hamburg and Rotterdam to British Possessions outside the United Kingdom, and a quantity of muriate of potash for shipment direct to the United States, these sales being made on the advice of the Potash Distribution Committee.

Mr. F. F. Renwick on Photographic Problems

AFTER a lapse of some six years the Dr. Ferdinand Hurter Memorial Lecture was revived at the meeting of the Liverpool Section of the Society of Chemical Industry, held on Thursday, May 27. The lecture was delivered by Mr. F. F. Renwick, who is associated with Kodak, Ltd., at Ilford.

Mr. Renwick's lecture, whilst it did not break much new ground as regards the application of catalytic chemistry to photographic methods, summarised the work of the chemists who have, not only in this country, but on the Continent and in America, turned their attention to the chemical development of the industry. It demonstrated by means of argument and experiment the possibility of developing in a weak artificial light previously exposed photographic plate. The process actually adopted was to coat the plate immediately after exposure with silver iodide, and from what Mr. Renwick showed, some very good results are possible. Mr. Renwick noticed the various factors on which the shape of the characteristic curve of the dry-plate depended, and illustrated these with diagrams shown on the screen. He also dealt with three of the ascertained properties of the latent image. These were the development of a fixed plate by means of a physical developer, the transference of the latent image from one silver salt to another and its subsequent development, and the sensitiveness to light (destructibility) of the latent image itself.

In moving a vote of thanks to the lecturer, Dr. Armstrong remarked that it was generally thought that in this country we were considerably behind others in the application of chemical science to photography, but after listening to Mr. Renwick's lecture, he was quite sure that so long as such zeal as was displayed by Mr. Renwick in investigating the technical side of photography was shown this country would maintain its premier place amongst the nations of the world.

Dr. Taylor, a co-worker with Dr. Hurter at Widnes for many years, seconded the vote of thanks, which was passed.

Biochemistry of the Sterols

Second Lecture by Dr. Gardner

DR. GARDNER on Tuesday, May 25, delivered the second lecture of his course on "The Biochemistry of Sterols," at the Physical Laboratory, London University, South Kensington.

It was shown that cholesterol was an unsaturated secondary alcohol, in proof of which the following crystalline derivatives were described :—

Cholesteryl chloride, MP96°	$C_{27}H_{45}Cl$
Dibromide of cholesteryl chloride, MP128°	$C_{27}H_{45}Br_2Cl$
Dichloride of cholesteryl chloride, MP106°	$C_{27}H_{45}Cl_3$
Cholesteryl acetate dichloride	$C_{27}H_{45}Cl_2{\cdot}O{\cdot}COCH_3$
Cholesterin dibromide	$C_{27}H_{45}Br_2{\cdot}OH$.

No secondary alcoholic nature was shown by the preparation of the corresponding unsaturated ketone, cholesterone $C_{27}H_{44}O$, cholesterol being $C_{27}H_{46}O$. This substance melts at 78°, and forms a characteristic phenylhydrazone, a semi-carbazone and an oxim.

The next question was how were the 27 carbon atoms linked up in the molecule ? It was many years since this analogy of cholesterin with polyterpenes was recognised, and the work which had led to the modern view of the constitution had necessarily been slow. We might conveniently group the work bearing on the problem under three heads, but to gain this advantage we must depart from chronological sequence :—

1. The study of the oxidation products of cholesterol with the same number of carbon atoms. Progress was slow at the beginning, for the proper interpretation of results was often dependent on a knowledge of the properties of series of comparatively simple aliphatic and cyclic saturated and unsaturated helones, dilutones and the like.

2. The study of the reduction products of cholesterin, and the action of oxidising agents on these. Here again, rapid progress had only been rendered possible by the development of methods of catalytic reduction in recent years, dating from the discoveries of Sabatier and Senderens.

3. The step-by-step breaking down of the sterol molecule, and also the results of drastic oxidation.

Before considering the work under heading (1), the lecturer gave an account of the substances formed by the drastic oxidation by means of fuming nitric acid and other powerful agents. He mentioned that the following simple substances had been isolated and identified : Dinitro isopropane $(CH_3)_2C(NO_2)_2$, acetone, acetic acid, oxyisobutyric acid, succinic acid, methyl succinic acid, and methyl glutoric acid, methyl isohexyl ketone, and probably octane and octylene. Also amorphous acids probably $C_{12}N_{16}O_8OC_{13}HO_8$.

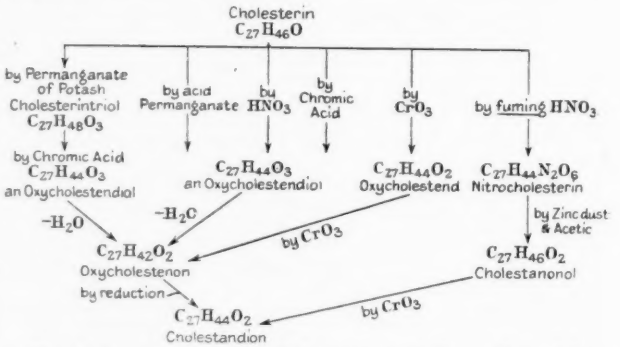
The lutoalcohol cholestannol could be connected by PCl_5 to chlorocholestanon. This, on oxidation with fuming nitric acid, yielded a chlordicarboxylic acid $C_{27}H_{45}ClO_4$, which, on treatment with potash, gave a hydroxy acid $C_{27}H_{45}(OH)O_4$. This, on oxidation, yielded a kitidicarboxylic acid $C_{27}H_{44}O_5$, isomeric with the one described above. This, on strong oxidation, was attached at the ketone group and yielded a tetracarboxylic acid $C_{27}H_{44}O_8$, so that another ring structure had been broken. From this it seemed clear that cholesterin, assuming that in the reaction no intermolecular rearrangement took place, contained two rings at least, one containing CHOH and the other the doubly-linked carbon atoms.

Cholestandion by the action of bromine yielded a dibromo derivative, $C_{27}H_{42}Br_2O_2$, which some substance could also be obtained by the addition of bromine to the double link in the unsaturated diketone oxycholesterone $C_{72}H_{42}O_2$. The dion must, therefore, contain the complex $-CO{\cdot}CH_2CH_2{\cdot}CO-$ and the oxycholestenone $-CO-CH=CH-CO-$.

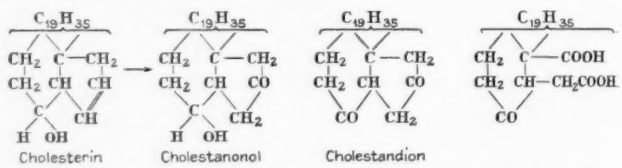
The lecturer then tentatively formulated the various reactions by a scheme, the general lines of which will be sufficiently indicated by the formulæ suggested for cholesterin, cholestannol and cholestandion, and the lutedicarboxylic acid. This led to the view that cholesterol contained an octyl side chain attached to one of the ring groups as follows :—

$$(C_{18}H_{27}O)CH_2CH(CH_3)CH_2{\cdot}CH_2CH_2CH(CH_3)_2$$

For many years the oxidation of cholesterol by various reagents had been studied by Mauthner and Suida, Windaus and his co-workers and others, and a large number of beautifully crystalline derivatives with the same number of carbon atoms had been described. Some of the more interesting were given in the following table. The formulæ assigned were, however, somewhat different from those given in the origina papers.



The lecturer gave a detailed account of the modes of formation and properties of these substances and their changes one into the other. In the change of cholesterol with cholestannol through the nitro derivative the group $-CH=CH-$ was converted to $-CO-CH_2-$. This was a well-known terpene reaction. The cholestandion contained the $-CO-CH_2-$complex, and also the CO group got by the oxidation of the secondary alcoholic group of the cholesterol. On oxidation by means of chromic acid in glacial acetic solution the dione gave a keto-dicarboxylic acid $C_{27}H_{44}O_5$. This, by treatment with acetyl chloride, lost water and formed an anhydride, so that the acid was probably built on the glutaric type. This could only be explained by the breaking of a ring containing the $-CH_2CO-$ complex. This was confirmed by the oxidation by means of persulphate according to a well-known reaction. The results suggested that the ring broken was a pentamillcylane ring.



The next lecture will deal mainly with reduction products of cholesterol.

Institution of Gas Engineers

SIR DUGALD CLERK, presiding on Tuesday at the annual meeting of the Institute of Gas Engineers at Storey's Gate, Westminster, stated that in 1917 the gas industry carbonised about 20 million tons of coal. The heat of 10·8 million tons was used to produce and distribute the coal gas utilised in the United Kingdom ; while the heat of 9·2 million tons remained available for use in the form of solid coke and semi-liquid tar and oil. At 45 per cent. thermal efficiency of gas production, the gas generated contained 25 per cent. of the original heat of the coal, or that given out by completely burning 5 million tons.

To enable the gas industry to supply gas at a minimum cost per therm delivered to the consumer, it was undoubtedly necessary to allow great liberty to gas engineers to modify existing processes. As the result of negotiations, eight resolutions were carried, which would enable the gas industry to settle for itself, by the introduction of improved methods of gas production, the exact nature of the modified processes to be employed to supply the public with the gas best suited to produce heat, power and light at the lowest practicable price and with the maximum economy of coal.

To increase the efficiency of gas utilisation, the construction and operation of all forms of gas-consuming apparatus should be seriously considered, and he suggested the desirability of the gas industry establishing a "Gas Institute," devoted solely to studying, testing and reporting on such apparatus.

Mr. T. Goulden, chief engineer of the Gas Light & Coke Co., was unanimously elected president of the Institution for the ensuing year. The vice-presidents elected were Mr. F. Hardy (Newcastle) and Mr. J. D. Smith (Belfast).

From Week to Week

SIR JOHN CADMAN is resigning his post as professor of mining at Birmingham University at the end of the current session.

The Franklin Institute has awarded Franklin Medals to SIR CHARLES A. PARSONS and PROFESSOR S. A. ARRHENIUS.

Liverpool University has conferred the honorary degree of Doctor of Science on PROFESSOR F. G. DONNAN, holder of the Chair of Chemistry in University College, London.

Damage amounting to several thousands of pounds has been caused by a fire which broke out in the acid department of the QUEENBOROUGH CHEMICAL WORKS.

SIX STUDENTS WERE KILLED and several seriously injured by an explosion which occurred during experiments in the chemical laboratory of the University at Munster last week.

Oxford University has conferred the honorary degree of Doctor of Letters upon DR. T. ZAMMIT, C.M.G., professor of chemistry in the University of Malta, and curator of the Valetta Museum.

LORD COWDRAY states that rumours which have recently appeared in the Press to the effect that he has become, or intends becoming, financially interested in English Oilfields, Ltd., are entirely without foundation.

The sixth death resulting from the naphtha fire which occurred at the DUNLOP RUBBER WORKS, Aston Cross, last week, took place on Friday, May 28, in the General Hospital, where Frank Hodges (19) died from shock due to burns.

The Birmingham Gas Committee at their meeting on Monday took farewell of Dr. E. W. SMITH, chief chemist, who is leaving the department to take up an important position with the Woodhall-Duckham Co., Ltd., designers and builders of gas-making plant, &c.

BARIMAR, LTD., scientific welding engineers, 10, Poland Street, London, W., announce the completion of arrangements for the opening of new branch factories at 156, Dharamtala Street, Calcutta, and at Delhi, Bombay, Madras, Karachi, Burma and Ceylon.

SIR ROBERT HADFIELD has given to the Institution of Mechanical Engineers £200, to be devoted to a prize, or prizes, for the description of a new and accurate method of determining the hardness of metals, especially of those which have a high degree of hardness.

The works of PIERSON, MORRELL & CO., LTD., in Upper Kennington Lane, S.E., were severely damaged by fire on Saturday. A building of three floors, used as stillrooms and laboratories, was the scene of the fire. This building was burnt out, and most of the roof collapsed. The damage is estimated at £15,000.

The May issue of *The Photographic Journal* contains the paper on "STUDIES ON PHOTOGRAPHIC SENSITIVENESS: THE ISOCYANINE DYESTUFFS," by Dr. W. H. Mills and Sir W. J. Pope, which was submitted to the December meeting of the Royal Photographic Society. The discussion bears testimony to the value of the research described in the paper and to the clearness with which the results were stated.

By the courtesy of the council of the Institution of Mechanical Engineers, the next ordinary scientific meeting of the CHEMICAL SOCIETY on June 17 at 8 p.m. will be held in the Lecture Hall of the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1, when Professor J. C. McLennan, F.R.S., of Toronto University, will deliver his lecture on "Helium."

With reference to the statement in last week's issue that "the only Vickers-built machine to be described in MR. GEE'S PAPER is at work in a factory near Newcastle-on-Tyne," we are informed that he does not propose to confine his paper to the description of this machine. There are a number of others, both at home and abroad, and the Newcastle machine was mentioned as being handy for inspection, owing to the annual meeting taking place in that city.

At a meeting of the NITRATE PRODUCERS' ASSOCIATION, held in Valparaiso on Friday, May 28, the suggestion that producers should renounce their individual right of withdrawing from the association on January 10 and extend the option to April 30 or June 30, 1921, was discussed. It is understood that about 19 per cent. were in favour of April 30 and 77 per cent. in favour of June 30, 1921, the balance being unrepresented. With a view to clearing up various details the meeting was adjourned until June 4.

At a meeting of Leeds University Council on Wednesday May 19, it was resolved that a CHAIR OF PHYSICAL CHEMISTRY should be instituted, and Dr. H. M. Dawson was selected to be the first occupant of the chair. Dr. Dawson has been lecturer in physical chemistry at the University since 1905, and has carried out extensive researches in various branches of physical chemistry—in particular, investigations bearing on the constitution of solutions and on the mechanism of chemical change.

Through the kindness of the Institute of Chemistry and in co-operation with them the next meeting of the London Section of the SOCIETY OF CHEMICAL INDUSTRY will be an informal meeting with some exhibits of plant and apparatus of interest to chemists held at the rooms of the Institute of Chemistry, 30, Russell Square, W.C., on Monday, June 7, at 8 p.m. The annual meeting of the Section will be held on Monday, June 14, at the offices of the Society of Chemical Industry, Central House, Finsbury Square, at 5 p.m., when the ordinary business of the annual meeting will be discussed.

The Department of Scientific and Industrial Research have offered a sum of about £30,000 to establish and equip at Cambridge University a low temperature station for RESEARCH IN BIO-CHEMISTRY AND BIO-PHYSICS, as well as to make provision for its maintenance. The Council of the Senate recommend that the offer be gratefully accepted, and that the scheme as formulated by the department be generally approved; also that a syndicate be appointed to obtain plans and estimates for the erection of the building on a site to be approved by the Senate.

MR. LEON COOPER, president of Cooper & Cooper Inc., of New York, distributors, exporters and importers of chemicals and dyestuffs, is at present in London on behalf of his firm to study the present conditions of the chemical industry in England and to further their connections with this country. The firm are members of the National Association of Manufacturers at New York and the Merchants' Association of New York. Mr. Cooper expects to stay in London for about six weeks at the Hotel Rubens, Buckingham Palace Road, S.W., from which address he will conduct business. He contemplates the opening of a branch office in London if he finds business sufficiently favourable.

Mr. M. L. Markwald, 74, Great Tower Street, E.C.3, on behalf of his associates, Messrs. H. M. Abel and G. H. Lemon, of Australia, announces the purchase from Mr. Hy. H. Markwald of his interests in Markwald Son & Abel, Markwald Son & Lemon, and Markwald Son & Co. The businesses formerly carried on under the above titles are now merged into Messrs. ABEL, LEMON & CO. PROPRIETARY, LTD., of Australia, of which concern Messrs. H. M. Abel, G. H. Lemon and M. L. Markwald are the directors. Mr. M. L. Markwald has been appointed buying agent for the company and all offers of goods for Australia should be sent to him at the above address.

The DRUG AND FINE CHEMICAL WORKERS' ASSOCIATION officially contradict the statement by the officials of the National Warehouse and General Workers' Union that there has been an understanding that any award or advance made by concession in June is to date back to April or to any other date. The position, it is stated, is that under the agreement between the unions and the Association claims for advances can be made in February, to come into force in April; in June, to come into force in August; and in October, to come into force in December. The February claim was decided against the unions by the Industrial Court. The strike was an unofficial one by the workers, who were dissatisfied with the award. The Association has refused to reopen consideration of that award, but from the outset pointed out that under the agreement, by which they stand, a claim could be received in June. The union leaders asked as an inducement for the men to return to work that any advance agreed to in June should be antedated. The Association declined, their attitude being clearly stated in a letter sent to the Ministry of Labour on May 21. The Association and the members involved in the strike have strictly adhered to that attitude, and no warrant has been given to any leader to offer on behalf of the employers any terms to the workers on strike.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used appeared in our issue of December 27 last.

British

AMMONIUM SULPHATE. The manufacture of neutral sulphate of ammonia. F. Shewring. *Gas World*, May 29, 453.

ANALYSIS. Direct experimental determination of the concentration of potassium and sodium ions in soap solutions and gels. C. S. Salmon. *Chem. Soc. Trans.*, May, 530-542.

The estimation of nitroform by potassium permanganate. P. V. McKie. *Chem. Soc. Trans.*, May, 646-648.

Determination of alkalis in tannery line liquors. W. R. Atkin and W. E. Palmer. *J. Soc. Chem. Ind.*, May 31, 145-146T.

Estimation of alcohol in mixtures of alcohol, sulphuric acid, and water. G. S. Butler and H. B. Dunnicliff. *J. Soc. Chem. Ind.*, May 31, 146-147T.

CATALYSIS. Studies in catalysis. Contact potentials and dielectric capacities of metals, in relation to the conclusion of hydrogen, and hydrogenation. W. C. McC. Lewis. *Chem. Soc. Trans.*, May, 623-638.

COAL. Researches on coal, I. and II. S. R. Illingworth. *J. Soc. Chem. Ind.*, May 15 and 31, 111-118T, 133-138T. The thermal decomposition of coal at low temperatures is dealt with and a new theory of coking is formulated, as a result of extensive experiments.

DYES. The cyanine dyes. Constitution of the isocyanines. W. H. Mills and R. S. Wishart. *Chem. Soc. Trans.*, May, 579-587.

EMULSIONS. Studies in Emulsions. A new method of determining the inversion of phases. S. S. Bhatnagar. *Chem. Soc. Trans.*, May, 542-552.

EXPLOSIVES. The decomposition of nitric esters by lime. J. M. Lowry, K. C. Browning, and J. W. Farmery. *Chem. Soc. Trans.*, May, 552-561. The decomposition of cordite has been investigated.

FLUORITE. Colouring matters of red and blue fluorite. C. S. Garnett. *Chem. Soc. Trans.*, May, 620-622.

GAS. The practice and control of oxide purification. G. Weyman. *Gas J.*, June 1, 489-490. A paper read before the North of England Gas Managers' Assocation, May 29.

IRON. The action of concentrated sulphuric acid on iron. C. E. Fawsitt. *J. Soc. Chem. Ind.*, May 31, 147-148T. The author has continued his experiments on methods of making iron passive to sulphuric acid.

PATENTS. Chemical patents. A. E. MacRae. *J. Soc. Chem. Ind.*, May 31, 176-178R. The subject is treated with special reference to Canadian patent law.

PUMPING. Chemical engineering group conference on pumping chemicals, &c. Abstracts of papers by N. A. Anfilogoff, J. H. West, R. A. Stewart, J. A. Reavell, S. J. Tungay, R. A. Gilmore, H. W. Crow, and W. Hayhurst (with diagrams), read at the Newcastle Conference on Dec. 12, 1919 (see *Chem. Age*, 1919, 709-713).

TURPENTINE. The constituents of Indian turpentine from *Pinus longifolia* Roxb. J. L. Simonsen. *Chem. Soc. Trans.*, May, 570-578.

VISCOSIMETRY. The falling sphere viscosimeter. W. H. Gibson and L. M. Jacobs. *Chem. Soc. Trans.*, May, 473-478. The theory of the instrument and some sources of error are discussed.

WIRE. Steel wire and wire drawing. E. A. Atkins. *Engineering*, May 28, 731-734. The first instalment of an interesting paper read before the Liverpool Engineers' Society.

Colonial

INDIA. Report of the Chemical Services' Committee, 1920, 121 pp. An account of the endeavours to establish an "All-India Chemical Service" (see *J. Soc. Chem. Ind.*, May 31, 1920, 175R).

ORES. Froth flotation at Broken Hill. C. C. Freeman. *Proc. Austral. Inst. Min. Met.*, Dec. 31, 1919, 89-110. An interesting record of modern developments.

French

ALUMINIUM. Contribution to the study of the tempering of some aluminium alloys. L. Guillet, J. Durand, and J. Galibourg. *Rev. Met.*, March, 202-215.

The nickel plating of aluminium and its alloys. L. Guillet and M. Gasnier. *Comptes rend.*, May 25, 1253-1256. A new nickel-plating process is described.

ANALYSIS. The entrainment of calcium and magnesium oxides by precipitates of ferric oxide. Toporescu. *Comptes rend.*, May 25, 1251-1253.

CYANAMIDE. The yields obtained in the manufacture of cyanamide, C. Pluvinge. *Chim. et Ind.*, April, 438-439. The yield by different processes are compared.

FABRICS. Dynamometric examination of fabrics coated with solutions of cellulose esters. L. Clément and C. Rivière. *Chim. et Ind.*, April, 440-444.

SLAGS. Rapid determination of the sum of the basic elements in blast furnace slags. A. Travers. *Chim. et Ind.*, April, 435-437.

STEEL. Industrial control of the depth of cementation on tempered samples. J. Galibourg and M. M. Ballay. *Rev. Met.*, March, 216-221.

SULPHURIC ACID. The manufacture of sulphuric acid by the chamber process. M. Kaltenbach. *Chim. et Ind.*, April, 407-421. Some causes of defects in the process are pointed out and remedies suggested.

TAR. Modern technique of the coal-tar industry. C. Berthelot. *Rev. Met.*, March, 169-201. A continuation of the paper already noted (*Chem. Age*, 1920, 445).

TUNGSTEN. Tungsten, its ores, metallargy, properties, and applications. C. Matignon. *Chim. et Ind.*, April, 422-434. A valuable general paper.

United States

CLAYS. Classification of clays on a ceramic basis. A. S. Watts. A. S. Watts. *J. Amer. Ceram. Soc.*, March, 247-251

The testing of clays for concrete aggregate. D. H. Fuller. *J. Amer. Ceram. Soc.*, March, 256-258.

COKE. By-product coke and by-products of coal. T. E. Pierce. *Blast Fur. and Steel Plant*, May, 283-287. A general paper, quoting interesting statistics.

IRON. Relation between dendritic structure and ferrite mesh. F. Giolitti. *Chem. & Met. Eng.*, May 19, 921-929.

METALS. Electric cleaning of metals for enamelling purposes. W. C. Lindemann. *J. Amer. Oram. Soc.*, March, 252-255. The electric pickling process is advocated.

MONTAN WAX. Montan wax. C. J. West. *Chem. & Met. Eng.*, May 19, 929.

REFRACTORIES. Magnesite refractories. J. S. McDowell and R. M. Howe. *J. Amer. Oram. Soc.*, March, 185-246. A valuable monograph, with full bibliography.

STEEL. A comparative test upon high-speed steels. A. J. Langhammer. *Chem. & Met. Eng.*, May 5, 12, and 19, 829-832, 889-892, 939-942.

WOOL. Further studies on the influence of humidity upon the strength and elasticity of wool fibre. J. I. Hardy. *J. Agric. Res.*, April 15, 55-62.

German

ANALYSIS. The theory of gravimetric analysis, with special reference to sources of error. L. Moser. *Z. anal. Chem.*, 1920, No. 1, 1-10.

The separation of chromium and manganese. M. Herschkowitsch. *Z. anal. Chem.*, 1920, No. 1, 11-12.

The decomposition of ammonium sulphide in general qualitative analytical processes. F. Feigl. *Z. anal. Chem.*, 1920, No. 1, 12-15.

COMBUSTION. The approximate estimation of the amount of combustion gases produced by coals. F. Cástek. *Feuerungstech.*, May 15, 133-136. Formulæ are given for estimating the gas production.

HYDROGEN. Improved form of Kipp apparatus for producing chemically pure hydrogen in the laboratory. M. Dolch. *Chem. Zeit.*, May 20, 378.

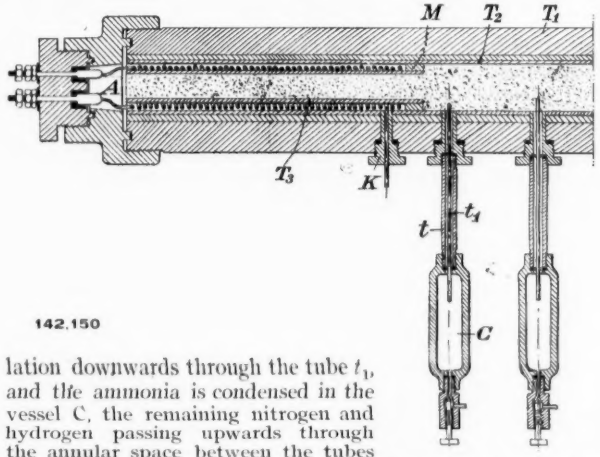
Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

Abstracts of Complete Specifications

142,150. AMMONIA, APPARATUS FOR THE SYNTHESIS OF—AT VERY HIGH PRESSURES. L'Air Liquide Société Anonyme pour L'Etude et L'Exploitation des Procedes G. Claude, 48, rue St. Lazare, Paris. International Convention date (France), February 20, 1918.

In Specification No. 130,086 (*see* THE CHEMICAL AGE, Vol. I., page 311), a process is described for the synthetic production of ammonia from a mixture of nitrogen and hydrogen compressed to a very high pressure, between 500 and 2,000 atmospheres, and then passed over catalytic material several times in succession at a temperature of 500°–700°C., the ammonia formed being separated by liquefaction after each catalytic operation. In the present invention only a single catalytic apparatus is used. The catalyst is packed in a thin metal tube T_2, which is surrounded by a layer of heat insulating material and then by a strong steel tube T_1. An inner tube T_3 projects partly through the tube T_2 and is terminated by an annular plug M. The gaseous mixture is introduced by the pipe K into the annular space thus formed and is heated by contact with the tube T_3 which is in contact with the reacting gases within, or alternatively the gas may be heated electrically by a coil S. The gas then passes through the space A into the catalytic material, and when the point M is reached, sufficient ammonia to be condensed will have been formed. To remove this ammonia a collecting receptacle C, which may be water-jacketed, is connected by the tube t to the reaction tube T_2. The great difference in density of the gas containing ammonia from that of the original mixture produces a circu-

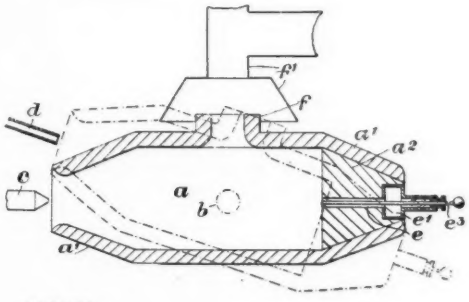


142,150

lation downwards through the tube t_1, and the ammonia is condensed in the vessel C, the remaining nitrogen and hydrogen passing upwards through the annular space between the tubes t and t_1 into the reaction tube, where it is subjected to further catalytic action. Other condensing vessels such as C are fixed in succession along the reaction tube. The tubes t and t_1 are insulated, and act as heat interchangers, so that the gas re-entering the reaction tube is at practically the same temperature as it leaves it. In a modification the gaseous mixture is preheated by passing it through a central tube of small diameter which traverses the whole length of the catalytic material.

142,157. OXIDATION OF TIN AND PRODUCTION OF TIN OXIDE, METHOD AND APPARATUS FOR—ALSO APPLICABLE FOR THE TREATMENT OF ZINC AND ZINC CONTAINING MATERIALS FOR THE PRODUCTION OF ZINC OXIDE. H. Maconochie, 128, High Holborn, London, W.C.1, and D. de Ros, Black Duck Wharf, Greenhithe, Kent. Application date, October 30, 1918.

An elongated cylindrical chamber a is mounted on trunnions b arranged transversely about the mid point. The ends a^1 are coned, and one end is plugged as at a^2, the plug having a duct e and box e^1 for the introduction of a blast of air at high pressure. An oil burner c, and a pipe d for admitting a blast of air at low pressure are provided at the other end. The chamber a is first heated to about 900°C. by the oil burner, and it is then tilted as shown in dotted lines so that the charge of molten metal submerges the mouth of the duct e. The high-pressure



142,157

blast is turned on just prior to the tilting, and the temperature rises to 1,500°–1,700°C. as a result of the oxidation of the metal. The low-pressure blast from the pipe d is then turned on, and any stannous oxide is converted into stannic oxide, the whole of the oxide being drawn off by the uptake f and pipe f^1. The level of the bath of metal is maintained by the introduction of fresh supplies. In the event of the duct e becoming choked, it may be cleared by the rod e^3. In a modification, two high-pressure blast nozzles are provided, one on either side of the chamber a and facing one another. The tilting of the chamber submerges one or other of the nozzles. This apparatus avoids the formation of "scull" and prevents overheating of the furnace lining.

142,176. SUBJECTING MATERIAL TO CHEMICAL TREATMENT AND GRINDING AND/OR MIXING, AND APPARATUS THEREFOR. F. R. Ablett, Highbank, Underhill, Reigate, Surrey. Application date, January 27, 1919.

Material to be ground and otherwise treated is fed into the top of a vertical cylinder partly filled with grinding balls and provided with baffles projecting inwards from the sides. The bottom of this cylinder is connected by a bend of the same diameter to the bottom of a screw conveyer working in a vertical cylinder, and the screw is provided with broad edges to assist in grinding the material as it is lifted to the top of the cylinder. The top of this cylinder is connected by another bend of the same diameter to the top of the first vertical cylinder. This cross passage contains a screen to separate the fine material, which falls into a launder and is conveyed away. If it is necessary to circulate the material more than once, the screen may be closed, and a closed circuit is thus obtained. In an alternative form, the grinding cylinders may be horizontal, while in another form the apparatus is surrounded by a heating jacket and adapted for vacuum drying. This apparatus may be connected in series with a washing and dewatering apparatus of similar type, the pitch of the conveyer blade being diminished towards the top to express the water.

142,206. DECOMPOSITION OF HYDROCARBONS AND OTHER SUBSTANCES IN THE LIQUID AND/OR VAPOUR PHASES. W. Mann, 84, Inchmery Road, Catford, London, S.E.6. Application date, February 6, 1919.

The process is more particularly for removing the products of decomposition of hydrocarbons produced by cracking, without the necessity for separate distillation or fractional

condensation, and to attain this object use is made of the more rapid diffusion of the lighter gases in a mixture through a porous partition. The heavy hydrocarbon may thus be kept continuously under the decomposition conditions, and the resulting products may be varied by varying the rate at which the vapour is allowed to pass through the porous partition; this rate is dependent on the difference in pressure on the two sides of the partition, and may be controlled by an adjustable spring-controlled valve in the outlet pipe. The porous partition is preferably placed in a separate chamber between the cracking chamber and the condenser to avoid clogging the pores with carbon deposits. A number of such diffusion chambers may be arranged either in series or parallel, the former being particularly suited for low temperature decomposition and the latter for high temperature decomposition. The process is applicable for the production of oil gas, coal gas, the low temperature distillation of coal, peat and the like, the distillation of shale, or for the separation of the low molecular weight products, *e.g.*, glycerol, obtained in the decomposition of fats.

142,226. CYMENE, PROCESS OF TREATING. The Selden Co. and J. M. Selden, 810, House Building, Pittsburgh, Pa., U.S.A. Application date, February 20, 1919.

The object is to obtain cymene derivatives from substances such as spruce turpentine, which also contains terpenes and other substances, without the necessity of first isolating the cymene. The turpentine is first partly purified by treating with quicklime to precipitate calcium sulphite, sulphate and hydrate, and the liquor, which then contains about 75 per cent. of cymenes, is nitrated. The cymene is first dissolved in strong sulphuric acid, and the mixture is then treated with a mixture of strong sulphuric and nitric acids, and cooled to 0°C. The cymene is converted into mono-nitrocymene, and the liquor is then added to a large quantity of cold water when the nitro compound containing principally 1-methyl-2-nitro-4-isopropyl-benzene floats on the top. The mono-nitrocymene may now be reduced to mono-amino cymene by boiling with iron and hydrochloric acid or other strong reducing agent. This product may be purified by agitating with dilute sulphuric acid to produce the sulphate of the amine and the terpenes may then be removed by steam distillation, since the sulphate is not volatile in steam. Milk of lime is then added to the aqueous solution to decompose the sulphate and liberate the the mono-amino compound, which is an oily liquid insoluble in water; it may be purified by steam distillation. The mono-nitrocymene may be reduced in alkaline solution to hydrazo cymene, which may then be subjected to the "benzidine transformation" to produce di-methyl-para-di-isopropyl-benzidine for use in the manufacture of dyes.

142,246. and 142,389. GRADING OR CONCENTRATING ORES AND THE LIKE. F. G. Gasche, 1224, Otis Building, Chicago, Ill., U.S.A. Application date, March 14, 1919.

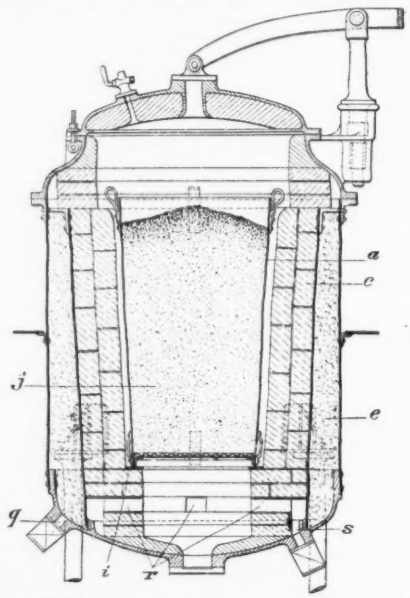
The object is to separate the particles of metal or metallic compound from the lighter gangue by a process which may be utilised in the vicinity of the mine or dump. The principle of projecting the particles in a jet of air and allowing them to settle according to their density is used. The jet is projected at a high velocity into a small chamber surrounding the nozzle and containing air at a pressure equal to the static pressure of the air in the jet. The lateral expansion of the jet is thereby prevented, while linear expansion and increase in the linear velocity of the particles is permitted. The jet then passes through a small outlet orifice into the atmosphere, which brings the moving particles to rest in a distance which varies with their density. The process and apparatus for treating the ore for the recovery of the mineral matter are described in detail.

142,310. NICKEL FROM CUPRO-NICKEL ALLOYS, SCRAP, AND THE LIKE, METHOD OR PROCESS FOR SEPARATING OR RECOVERING. A. McKechnie, Chad Hill Cottage, Edgbaston, Birmingham, and McKechnie Bros., Ltd., Rotton Park Street, Birmingham. Application date, May 10, 1919.

A charge of the alloy is melted on the hearth of a basic reverberatory furnace and air is blown through it. The nickel is converted into oxide and volatilised, and is carried over from the furnace and recovered in condenser flues, bag houses, or the like, or by electrical precipitation. The nickel is then obtained by reduction of the oxide. In an alternative method, the molten alloy is bessemerised in a basic converter until the nickel has been carried over as oxide.

142,354. CYANAMIDE, MANUFACTURE OF, AND APPARATUS THEREFOR. A. Duchemin, 69, Rue d'Amsterdam, Paris. Application date, June 30, 1919.

A sheet-iron crucible *a* is filled with very finely powdered calcium carbide *j* and is heated by the surrounding brickwork *c* which retains heat from the previous reaction. The nitrogen for the reaction enters the furnace at *q* and passes uniformly upwards through a layer of asbestos *e* to the top of the crucible. The bottom of the crucible rests on an asbestos ring *i* forming an airtight joint so that the nitrogen is compelled to travel downwards through the carbide and through the perforated



142,354

bottom of the crucible to the outlets *r* and *s*. The downward passage of the gas tends to keep the temperature of the crucible uniform. The reaction may alternatively be started by introducing a cartridge containing potassium, sodium, calcium, magnesium, or aluminium, and an oxide, chloride, bromide, or iodide, of another metal, and igniting the mixture.

142,376. DISTILLING BOILER FOR HEAVY HYDROCARBONS OF THE PETROLEUM, LIGNITE TAR, AND COAL TAR INDUSTRY AND THE LIKE. L. Steinschneider, Brunn-Konigsfeld, Czecho-Slovakia. Application date, August 14, 1919.

To avoid the use of very large retorts when distilling heavy hydrocarbons down to solid coke, and to facilitate the "glowing" of the coke, a number of small retorts project downwards from the bottom of the still boiler into a combustion chamber. The retorts preferably project beyond the combustion space at both ends, so that the lids and the boiler connections are removed from the furnace gases. The retorts are preferably conical to facilitate discharge of the coke at the bottom.

NOTE.—The following specifications which are now accepted were abstracted when they became open to inspection under the International Convention: 134,207 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to crystallising from solutions; and 138,111 (Soc. Industrielle de Produits Chimiques), relating to alkali chromates. *See* THE CHEMICAL AGE, Vol. II., pages 23 and 362.

International Specifications Not yet Accepted

140,777. OZONE. Soc. Anon. l'Azote Francais, 126, Rue de Provence, Paris. (Assignees of F. Gros et Bouchardy, Paris). International Convention date, March 22, 1919.

Air or oxygen is subjected to a silent electric discharge at a

pressure below 550 mm. of mercury and a temperature of −10°C., and the yield of ozone is thereby increased. A still better yield may be obtained by reducing the pressure to 400 mm. of mercury and a temperature of −100°C.

140,784. ACETALDEHYDE. Soc. Anon. de Produits Chimiques (Etablissements Maletra), Petit-Quevilly, Seine-Inférieure, France. International Convention date, March 24, 1919.

Acetaldehyde is produced by passing acetylene into an aqueous acid solution containing a catalyst such as metallic mercury, reduced mercury, mercuric oxide, or a mercuric salt, the activity of which is maintained by the addition of an oxidising agent, such as ferric oxide. The acetylene is previously washed with metal oxychlorides, and then with a solution of mercuric chloride in hydrochloric acid to purify it from phosphoretted hydrogen. The acid solution used for the reaction is preferably sulphuric acid of 30–35 per cent. strength, and it is maintained at 70°–83°C.; an excess of acetylene is used, and the solution is continuously agitated. Water, sulphuric acid, and ferric oxide are added periodically. Alternatively, sulphonic acids or acetic acid may be used.

140,798. FILTERING LIQUIDS. Worthington Pump and Machinery Corporation, 115, Broadway, New York. (Assignees of J. J. Berrigan, Orange, N.J., U.S.A.). International Convention date, March 9, 1918.

Two co-operating platens are mounted with their lower edges attached to the two ends of a horizontal rod in such a way that they are free to move towards and away from one another in a manner similar to that of a bellows. The mid-points of the platens are pivoted to levers which are themselves pivoted on fixed standards. The opposite ends of the levers are pivoted to a pair of floating cylinders and pistons so that the platens are moved relatively to one another by a movement of the pistons in the cylinders. This construction ensures that the strain and weight of the press are taken by the pedestals. The filter bags are suspended from transverse bars resting on the side frames and a supplementary pressing partition is arranged between each pair of filter bags. Means are provided to ensure the correct spacing of the filter bags when the press is in the open position, and a separate valved connection is provided for supplying the material to be filtered to each bag. The lower edges of the platens may be separated when it is desired to empty the bags.

LATEST NOTIFICATIONS.

143,500. Porous Material, Manufacture of. Norske Aktieselskab for Elektrokemisk Industri Norsk Industri Hypotekbank. May 16, 1919.

143,503-4. Electric Furnaces having resistance conduits. J. R. de Zubiria y Smith. May 21, 1919.

143,525. Metallic Ores, Process of treating. J. W. Moffat. April 30, 1918.

143,545. Wood, Destructive distillation of. E. M. Sawtelle. September 10, 1916.

143,550. Ammonia, Production of. Nitrogen Corporation. March 23, 1916.

Specifications Accepted, with Date of Application

127,821. Rubber compounds. N. D. Neilsen. May 31, 1918.

142,519. Heat-exchangers for the continuous rectification of mixtures of liquefied gases. E. Barbet et Fils et Cie. October 9, 1917. Addition to 131,321.

142,522. Heat-interchangers for gases for use in the contact process for making sulphuric acid. P. Audianne. December 7, 1918.

142,541 Furnaces for the distillation of asphalte rock, bituminous slate, and the like. A. La Porta and R. de Bartolomeis. February 3, 1919.

142,576. Catalyst, Production of. W. P. Schuck. February 18, 1919.

142,689. Gas-retorts. E. A. Groundstroem. June 6, 1919.

142,703. Purification of oil and other liquids, Apparatus for. King's Patent Agency. (*D. Stone*). July 2, 1919.

142,710. Furnaces. T. Tiesen. July 16, 1919.

142,715. Heating or cooling fluids, Apparatus for. W. J. Mellersh-Jackson. (*Griscom-Russell* Co.). July 28, 1919.

142,721. Refractory material. British Thomson-Houston Co. (*General Electric Co.*). August 19, 1919.

142,738. Para-cymene. Manufacture of. British & Foreign Chemical Producers. (Reinische Kampfer-Fabrik Ges.). October 6, 1919.

119,030. Alcohol and yeast from sea-weed. Process for the production of. E. C. Bayer and S. Orla-Jensen. May 14, 1919.

123,325. Formic, acetic and butyric acids, Utilisation of marine algæ for the manufacture of—and for the extraction of salts of iodine and potash. Soc. Darrasse Freres and L. Dupont. February 13, 1918.

123,326. Carbohydrate contained in plants, vegetable offal and in natural or industrial waste products. Soc. Darrasse Freres and L. Dupont. Feb. 13, 1918.

124,199. Vertical ovens, Method and apparatus for producing a regular progression of materials in. Soc. du Four Vertical Continu. March 1, 1918.

136,145. Ores, Apparatus for concentrating or washing—and for similar purposes. M. Lesser. December 2, 1918.

137,296. Potassium sulphate, Manufacture of. Fabriques de Produits Chimiques de Thann et de Mulhouse. December 28, 1918.

138,862. Electrolysis of metal-salt solution, Apparatus for. Fredriksstad Elektrokemiske Fabriker Aktieselskabet (F.E.F.). February 13, 1919.

142,874. Hydrogen and nitrogen, Manufacture of mixtures of. J. Harger. November 28, 1917.

142,902. Purification of organic substances by sublimation, Process of. Selden Co. and J. M. Selden. February 3, 1919.

142,941. Treating air or gases with liquids or vice versa, Apparatus for. W. J. Bulgin, E. A. Hall and G. Searle. February 17, 1919.

142,947. Aromatic arsenic acids, Process of preparing. A. Mouneyrat. February 20, 1919.

142,949. Self-balancing centrifugal or hydro-extractor basket. W. McChesney. February 21, 1919.

143,002 and 143,082. Electrolysing liquids, Apparatus for. J. S. Withers. (*National Electro-Products, Ltd.*) April 23 and June 26, 1919.

143,064. Powerful oxidising gases for removing carbon and sulphur deposits in hydrogen gas manufacture, Process and apparatus for. Blair, Campbell & McLean, D. A. Blair and J. L. Ferguson. June 11, 1919.

143,176. Electric furnaces. W. E. Moore. February 14, 1919.

Applications for Patents

Abrahams, E. Goldsmid, and Barker, J. W. Supplying air to producer-gas plants. 14,269. May 25.

Anderson, W., and Meikle, J. Treating blast-furnace tar. 14,567. May 28.

Angel, H. R. Reduction of sulphides, refractory, &c., ores. 14,334. May 26.

Atomised Products Corporation. Treating Waste sulphite liquors, and products obtained therefrom. 14,387. May 26.

Boby, Ltd., R., and Jennings, M. Separating dust, &c., from gases. 14,501. May 27.

Carpmael, W. (Farbenfabriken vorm. F. Bayer & Co.). Furnaces for manufacture of hydrochloric acid and sodium sulphate. 14,466. May 27.

Chemische Fabrik Griesheim-Elektron. Manufacture of acetaldehyde from acetylene. 14,516. May 27. (Germany, August 10, 1916.)

Duckham, Sir A. M., J. S. Morgan, and Thermal Industrial & Chemical Research Co. Stills for distilling tar, oils, &c. 14,379. May 26.

Elektro-Osmose Akt.-Ges. (Graf. Schwerin Ges.) Flotation processes for concentrating ores. 14,625. May 28. (Germany, July 29, 1918.)

Elektro-Osmose Akt.-Ges. (Graf. Schwerin Ges.) Tanning or impregnating materials. 14,626. May 28. (Germany, November 30, 1918.)

Elektro-Osmose Akt.-Ges. (Graf. Schwerin Ges.) Tanning or impregnating materials. 14,704. May 29. (Germany, July 9, 1919.)

Feldenheimer, W., and Plowman, W. W. Catalysts and catalytic reactions. 14,397. May 26.

Kinzlberger & Co. Purification of anthraquinone. 14,457. May 27. (Austria, September 20, 1917.)

Lamplough, F., and Synthol, Ltd. Oil-cracking. 14,288. May 25.

Liebig, W. Roasting fine granular sulphur ores. 14,597. May 28.

Soc. Chimique des Usines du Rhône, Anciennement Gilliard, P. Monnet et Cartier. Preparation of di-alkyl-amino-ethyl derivatives of theobromine. 14,465. May 27. (France, March 1.)

South Metropolitan Gas. Co. and Medsforth, S. Purifying anthraquinone. 14,275. May 25.

South Metropolitan Gas Co. and Stanier, H. Manufacture of naphthylamine sulphonic acids. 14,276. May 25.

Union Carbide Co. Manufacture of calcium carbide. 14,372. May 26. (U.S.A., January 20, 1915.)

Union Carbide Co. Manufacture of calcium carbide. 14,373 May 26. (U.S.A., August 15, 1917.)

Vakil, K. H. Refining oils and fats. 14,023. May 28.

MR. JOHN MYERS, chief metallurgical chemist to Mr. G. R. Thompson, public analyst for Monmouthshire, has been elected to a fellowship of the Institute of Chemistry.

Chemical Trade Inquiries

Locality of Firm or Agent.	Materials.	Ref. No.
South Africa (Johannesburg)	Aluminium ware; glassware ...	749
Belgium (Liége)...	Zinc; tin; aluminium	754
Italy (Verona) ...	Soap; chemical products; mineral oils.	772
Poland (Warsaw)	Chemical products	776
Africa (Tripoli) ...	Glassware	781
Canada (Toronto)	Oleine	748
Toronto	Chemical Fertilisers; China Clay; Light Carbonate of Magnesia; Dry Shellac	— —
Montreal ...	Chemicals; Celluloid	—
Brussels	Wholesale Drugs; Pharmaceutical and Industrial Products	—
Brussels	Chemical and Pharmaceutical Products	—
Montreal ...	Druggists' Supplies	—

Aluminium Welding

The case of Aktiengesellschaft für Autogene Aluminium Schweissung, of Zurich, against the London Aluminium Co., Ltd., of Aston, Birmingham, an infringement of patent action, which was decided in favour of the plaintiffs by Mr. Justice Sargant in the Chancery Division on May 21, again came before his lordship on Wednesday for discussion as to the form which the order of the Court should take.

Sir A. Colfax, K.C., for the plaintiffs, reminded his lordship that he had found that both patents, which related to improvements in welding aluminium, were valid, and that both had been infringed. He (counsel) therefore asked for an injunction in the usual terms, an inquiry as to damages, delivery up of the infringing articles and costs on the higher scale.

Mr. J. Hunter Gray, K.C., for the defendants, opposed costs on the higher scale, and asked for a stay of execution as to costs and damages, with a view to an appeal, on the undertaking that the appeal, if decided upon, would be given notice of within 14 days. As to delivery up of infringing articles, he asked that the defendants should be allowed to exercise the option of undoing the joints of any vessels on which they had used the welding flux. He was informed that they had orders in hand to the amount of £8,000 or £9,000, for the carrying out of which half-a-crown's worth of flux would be required. He thought they should be allowed to carry out those orders.

His Lordship granted the injunction, with costs, but declined to order them on the higher scale; directed an inquiry as to damages; declined to suspend the injunction even as regarded pending orders, but thought that the plaintiffs should allow the defendants to return to customers articles actually welded. He granted a stay of execution as to costs and damages on defendants appealing within 14 days.

San Lorenzo Nitrate

Presiding at Liverpool on Thursday, May 27, over the annual meeting of the San Lorenzo Nitrate Co., Ltd., Mr. W. H. Hasler said that after many difficulties the new association had become established, and although the initial sale price had proved to be too low, it was a start which had been followed by improvements until quite a satisfactory level of prices had been reached. The company's works had been stopped for six months of the year, and in the remaining period a working profit of £3,516 had been realised, but this had been more than absorbed by the £6,000 extra cost of duties payable in gold. The company's properties, it was estimated, contained nitrate contents amounting to 4,646,621 quintals in virgin ground, and 4,837,500 quintals in the old ground. To secure the best yields an improvement of plant was being considered, the cost of which was estimated at £50,000. On an output of 600,000 quintals per annum for 10 years the estimate of profit carefully arrived at was £118,800 per annum. With regard to the nitrate position, shipments for the year ending June 30 would exceed 2,000,000 tons, and in view of adverse conditions and with the markets of Central Europe still inaccessible there was reason for satisfaction at this result. He thought the augury for next year was good.

The Consumers' Strike

By Ernest J. P. Benn, Editor of "Ways and Means"

A strike on the part of the consuming public may be said to have begun and to be spreading very rapidly. If this movement had started eighteen months ago, or even during the war itself, it would have saved us a good deal of trouble. The determination of the consumer to consume and the buyer to buy has been the main cause in the continual rise in all prices during the last few years. The public is gradually awakening to this truth as it realises the futility of attempts to stop what is called "profiteering," and is coming to see that the only power which can regulate a price is the willingness or unwillingness of the buyer to pay it.

It is highly desirable that we should all realise to the full the main features of the changes that have taken place and the lines along which further change is desirable. In the last few years we have doubled and trebled values of every kind. We express this movement in our Irish way by saying that the sovereign is worth 8s. 6d.; by gradual stages the sovereign has slowly depreciated in value, until to-day goods which before the war would have been marked 8s. 6d. are now ticketed £1. This process has been going on for about five years, which means that the sovereign has gone down by 2d. or 3d. a month. We have now to get the £1 sterling back to parity, and it would be an advantage to everyone if that process could be carried out rather less rapidly than was the reverse operation. The steady rise in the value of commodities and in wages and prices generally has had at least one advantage. It has given to us all an appearance of prosperity; it has almost shut up the Bankruptcy Court; and, indeed, if we could arrange the world so that prices would never cease rising, most of the objections to inflation would disappear. But the trouble is that inflation must be followed by deflation, rises must be succeeded by falls, high prices must be the precursors of falling markets, and those falls are very dangerous things; they bring in their train bankruptcy, unemployment and financial crises. These evils are accentuated if the fall is sudden or deep.

Thus we begin to see the ideal arrangement, if it were possible to work this great thing out in the ideal way. We have knocked the sovereign down 2d. or 3d. a month; if we can put it up again at the rate of 1d. or 2d. a month, at a rather slower rate than we knocked it down, our difficulties would be minimised very considerably. Thus we are constrained to ask that the consumers' strike, which is a healthy, necessary and proper procedure, should be applied gently, gradually and leisurely. If the consumer declines to buy existing stocks at present prices he will force large numbers of workmen into unemployment; if he insists upon drastic reductions in prices, he will force large numbers of manufacturers and merchants into bankruptcy. If, on the other hand, he is content with a gradual price reduction, he will enable the holders of stocks to negotiate their moderate losses, and will give time to manufacturers and to Labour so to reduce prices by increasing output as to bring them down by degrees to normal.

From the Labour point of view the situation is perilous and unprecedented, and requires handling with skilful statesmanship. If Labour continues to push up wages and push down output, prices will get worse, and the consumers' strike will become more determined; wholesale bankruptcy and unemployment is the inevitable outcome of any such policy. If, on the other hand, Labour will, before it is too late, turn its attention to output, it can so reduce prices as to meet and stultify the consumers' strike. It can, indeed, do better: it can promote demand, which always follows lower values. The consumer is at last coming back into his right position. For years everything has been fixed on the assumption that he would do just what he was told; he has been rationed, controlled and ordered; he has been told exactly how many ounces of everything he might have; exactly where he might purchase it, and exactly what he must pay. At last he is beginning to wake up to the fact that he is the real master of the situation; that an article is only worth what it will fetch, and that all the controllers or ministries or soviets on earth cannot force him to buy a single ounce of tobacco or a single pair of boots unless he is so inclined. As this fundamental truth dawns on the minds of the world's consumers, so industry will become normal, natural and free. But the process must be gradual, otherwise we shall have bank crises and unemployment.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

WEDNESDAY, June 2.

Only a limited business has been passing during this week, and the Northern markets have been particularly quiet, which is, however, only to be expected, having regard to the extension of the holiday into the early days of this week, and more general resumption of business may be expected next week.

Manufacturers are fully occupied, and are generally well sold for the whole of this year. The position regarding export business remains unchanged, and the volume of trade would be considerably increased if manufacturers' delivery dates were not so distant.

General Chemicals

ACETONE.—The stocks held here are being steadily observed, and higher prices are likely to be seen in the near future. The demand for export is still well maintained.

ACID ACETIC remains a firm market, and supplies arriving are immediately taken up at full prices.

ACID CARBOLIC is inactive, and nominally without change in value.

ACID CITRIC is still somewhat depressed owing to profit taken, but the undertone remains satisfactory.

ACID FORMIC is a quiet market, and prices are fully maintained.

ACID OXALIC has again been in good demand for export, and the price is inclined to be slightly firmer.

ACID TARTARIC is in moderate demand, and the price has a firmer tendency.

AMMONIUM SALTS.—Makers are well sold for some way ahead but the general position is comparatively steady.

ARSENIC shows no change in value, and is in only moderate inquiry.

BARIUM SALTS remains in good demand, and prices are well maintained.

BLEACHING POWDER is practically unobtainable, and small parcels in second hands are eagerly snapped up at high prices.

CALCIUM ACETATE is still in short supply, and is a strong market.

COPPER SULPHATE is practically dead, and sellers are inclined to make concessions in price.

FORMALDEHYDE shows no change in price, and the demand is steadily maintained.

LEAD SALTS have been uninteresting, and the price is nominally without change.

MAGNESIUM SALTS have been in quiet demand at recent values.

POTASSIUM PRUSSIATE is a steady market, and the small supplies are rapidly disposed of.

POTASSIUM PERMANGANATE is still short for early delivery, and values are fully upheld.

SODIUM ACETATE only shows a limited inquiry, but is firmly upheld.

SODA CAUSTIC.—The strong export demand continues, and the price is, if anything, slightly firmer.

SODIUM HYPOSULPHITE is practically unobtainable for early delivery, and the price is purely nominal.

SODIUM NITRITE is a quiet market, but the price is unchanged.

SODIUM PHOSPHATE is distinctly scarcer, and the recent advances in price is fully maintained.

SODIUM SULPHIDE.—Only second-hand parcels are available, and command an extravagant figure.

TIN SALTS remains quiet and easy.

ZINC SALTS.—No change in value is reported, and the demand is on the small side.

Coal Tar Intermediates

There is no change to report in the intermediate position, and prices are all the same as quoted in our list last week. Deliveries for the majority of intermediates cannot be obtained for anything like prompt delivery.

Coal Tar Products

There is little change in our market from last week.

90's BENZOL is in good demand at 2s. 9d. to 2s. 10d. per gallon on rails.

CREOSOTE OIL is in good demand at 1s. to 1s.1d. in the North and 1s. 1d. to 1s. 2d. in the South.

SOLVENT NAPHTHA 90/160.—This shows a slight improvement, and is worth about 2s. 10d. to 2s. 11d. on rails.

HEAVY NAPHTHA, 90/190 is in good demand at 3s. 4d. to 3s. 6d. per gallon.

NAPHTHALENE remains scarce, and the prices are somewhat irregular; crude is worth £15 to £22 per ton, according to quality, and refined £36 to £40 per ton. Some sellers are asking as much as £50 per ton.

PITCH.—The market continues firm, and there is a good demand for next season's deliveries. Business is being done at 160s. to 165s. f.o.b. East Coast, and there are very few sellers on the West Coast at much under these prices.

Sulphate of Ammonia

The Home demand continues good, and some parcels have been sold for export at prices fixed by the Control.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	3	6	to	0	3	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	125	0	0
Acid, Acetic, glacial, 99-100%	ton	120	0	0	to	122	10	0
Acetic, 80% pure	ton	97	0	0	to	98	10	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	3	to	0	1	3½
Citric	lb.	0	6	0	to	0	6	3
Formic, 80%	ton	125	0	0	to	130	0	0
Gallic, pure	lb.	0	7	3	to	0	7	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	62	0	0	to	63	0	0
Lactic, 60 vol.	ton	75	0	0	to	77	10	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	11	to	0	3	0
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	10	to	0	3	0
Salicylic, B.P.	lb.	0	3	8	to	0	3	10
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	4	0	to	0	4	2
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	32	10	0	to	37	10	0
Ammonia, .920	ton	20	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	115	0	0	to	120	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	60	0	0	to	65	0	0
Ammonia, phosphate	ton	130	0	0	to	135	0	0
Ammonia, sulphocyanide	lb.	0	2	3	to	0	2	6
Amyl, acetate	ton	360	0	0	to	370	0	0
Arsenic, white, powdered	ton	67	10	0	to	70	0	0
Barium, carbonate	ton	13	10	0	to	14	10	0
Carbonate, 92-94%	ton	14	10	0	to	15	0	0
Barium, chlorate	lb.	0	1	4	to	0	1	5
Chloride	ton	36	0	0	to	37	0	0
Barium, Nitrate	ton	55	0	0	to	56	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	18	10	0	to	19	10	0
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
,, Grey	ton	35	0	0	to	37	10	0

	per	£	s.	d.		£	s.	d.
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	9	10	0	to	10	10	0
Carbon bisulphide	ton	58	0	0	to	59	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	7	3	to	0	7	6
Oxide, black	lb.	0	7	9	to	0	8	0
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	45	0	0	to	46	0	0
Cream Tartar, 98-100%	ton	300	0	0	to	305	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	345	0	0	to	350	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	15	0	to	5	0	0
Lead acetate, white	ton	95	0	0	to	97	10	0
Carbonate (White Lead)	ton	75	0	0	to	77	10	0
Nitrate	ton	72	0	0	to	75	0	0
Litharge	ton	62	10	0	to	65	0	0
Lithopone, 30%	ton	59	0	0	to	61	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	14	0	0	to	14	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to	—		
Sulphate	ton	105	0	0	to	110	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel ammonium sulphate, single salt	ton	50	0	0	to	52	10	0
Potassium bichromate	lb.	0	2	2	to	0	2	3
Potassium Carbonate, 90%	ton	102	0	0	to	105	0	0
Chloride	ton	Nominal.						
Chlorate	lb.	0	0	10	to	0	0	10½
Meta-bisulphite, 50-52%	ton	270	0	0	to	280	0	0
Nitrate, refined	ton	70	0	0	to	72	0	0
Permanganate	lb.	0	5	9	to	0	6	0
Prussiate, red	lb.	0	6	3	to	0	6	6
Prussiate, yellow	lb.	0	2	3½	to	0	2	4½
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	15	0	to	—		
Seconds	cwt.	6	0	0	to	—		
Sodium acetate	ton	61	0	0	to	63	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	2	0	to	0	2	1
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0
Chlorate	lb.	0	0	5½	to	0	0	6½
Caustic, 70%	ton	43	10	0	to	44	10	0
Caustic, 76%	ton	44	10	0	to	45	10	0
Hydrosulphite, powder, 85%	lb.	0	3	9	to	0	4	0
Hyposulphite, commercial	ton	37	10	0	to	40	0	0
Nitrite, 96-98%	ton	120	0	0	to	125	0	0
Phosphate, crystal	ton	39	0	0	to	41	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	9	to	0	1	9½
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	60	0	0	to	62	10	0
Sulphite, cryst.	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	24	0	0	to	26	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	5	to	0	3	6
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	72	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	0	to	0	5	3
Alphanaphthylamine	lb.	0	4	0	to	0	4	3
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	10	to	0	2	0

	per	£	s.	d.		£	s.	d.
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	12	6	to	0	13	6
Benzidine, sulphate	lb.	0	10	0	to	0	11	0
Benzoic, acid	lb.	0	5	6	to	0	6	0
Benzoate of soda	lb.	0	5	6	to	0	6	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	5	3	to	0	5	6
Betanaphthylamine, technical	lb.	0	8	6	to	0	9	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	6	to	0	3	9
Dimethylaniline	lb.	0	5	0	to	0	5	3
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	0	to	0	14	6
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	4	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	2	to	0	1	4
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	7	to	0	1	8
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	3	to	0	8	9
Paranitrophenol	lb.	0	2	6	to	0	2	9
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	7	6	to	0	8	6
Phthalic anhydride	lb.	0	5	6	to	0	6	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	5	to	0	1	6
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

The Cardiff By-products Market

Our Cardiff correspondent writes that the supplies available are not sufficient to meet the demand. Prices therefore continue to remain generally steady, as follows :—

Sulphate of Ammonia—	
For home consumption (per ton)	£21 10s. net
For export (per ton f o b)	£30 to £40
Benzol, 90's (per gallon)	2s. 7d. to 3s.
Ditto, 50's, per gallon	2s. 7d.
Solvent Naphtha, per gallon	3s. 3d. to 3s. 9d.
Heavy Naphtha, per gallon	3s. 3d. to 3s. 6d.
Crude Naphthalene Salts, per ton	£10 to £16
Pitch, per ton	£7 5s. to £7 15s.
Creosote, per gallon	1s. to 1s. ½d.
Motor Benzol, per gallon	2s. 7d. to 3s.
Crude Benzol, per gallon	2s. 7d.
Toluol, per gallon	2s. 7d.

A fire which broke out on Monday at an oilcake and grain stores of the ABERDEEN COMMERICAL CO. caused damage estimated at £150,000.

Another fire broke out on Friday, May 28, in the spreading shed of the DUNLOP RUBBER CO., Catherine Street, Ashton. On this occasion, fortunately, no one was injured. The outbreak originated with the spreading machine, and the contents of the shed became involved. The Aston and Lingard St eet contingents of the fire brigade were summoned, and the flames were quickly extinguished.

Company News

MALAYAN TIN DREDGING.—The directors have declared an interim dividend of 1s. per share (less tax), payable on June 23.

BERENGUELA TIN MINES.—An interim dividend has been declared of 10 per cent., less tax, for the year ending June 30, 1920.

LEVER BROTHERS.—The re-classification of the capital of Lever Brothers, Ltd., was agreed to at a meeting of shareholders at Port Sunlight last week.

UNITED PREMIER OIL AND CAKE.—The recent offer to ordinary shareholders of 250,000 ordinary shares at £1 5s. per share has been largely over-subscribed.

HARRISONS & CROSFIELD.—A dividend has been declared on the preferred ordinary shares at the rate of 10 per cent. per annum for six months ending June 30, less tax.

LAUTARO NITRATE.—A dividend has been declared of 16s. per share, free of tax, making 16 per cent., for the year, payable on July 1, against 18 per cent. in the preceding year.

NORTH LONSDALE IRON & STEEL.—An interim dividend of 5 per cent. (10s. per share), less tax, has been declared, payable on June 3. Last y ar the dividend was 4½ per cent.

AGUAS BLANCAS NITRATE CO.—The accounts for 1919 show a loss of £18,121 after providing for interest charges, and the surplus of £46,570 brought forward was reduced to £28,449.

BRITISH GLASS INDUSTRIES.—A meeting has be n convened for June 10 for the purpose of increasing the nominal capital of the company to £5,000,000, and capitalising a portion of the premium reserve.

MILLOM & ASKAM HEMATITE IRON.—The board have declared an interim dividend of 3 per cent., free of tax, on the ordinary shares, on account of the current year. A year ago the dividend was 6 per cent.

PIERCE OIL CORPORATION (NEW YORK).—A common stock dividend of 5 per cent. has been declared, of which 2½ per cent. is payable on July 1, 1920, to holders of record on May 31, and 2½ per cent. payable on Oct. 1, to holders of record on Aug. 31.

NEVADA CONSOLIDATED COPPER.—The report for the year to Dec. 31, 1919, states: Treated 2,135,425 tons ore, averaging 1·599 per cent. copper. Productions, 43,971,982 lb. copper. Net cost of production, 16·14 c. per lb. copper. Net earnings for 1919, $1,110,407, representing a profit of 2·526 c. per lb. copper.

BRUNNER, MOND & CO.—The directors have declared an ordinary dividend for the half-year ended March 31 at the rate of 12½ per cent. per annum, making 11¼ per cent. for the year, less tax; £50,000 is placed to suspense, £150,600 is charged against profits for depreciation, and £126,000 is carried forward. Last year's dividend was 10 per cent.

CHINA COPPER.—The report for the year to December 31, 1919, states: Treated at mill during the period, 1,765,200 dry tons of ore, averaging 1·82 per cent. copper. Net production, 40,488,706 lb. of copper, also silver and gold valued at $17,927. Net cost of copper production, 15·53 c. per lb. Average price received for copper, 18·784 c. per lb. Net income, $1,301,797. Ore reserves at December 31, 1919, 94,781,525 tons, averaging 1·62 per cent. copper.

UTAH COPPER.—The report for the year to Dec. 31, 1919, states: Treated at the mill during the period, 5,538,700 tons ore, averaging 1·26 per cent. copper. Net productions, 105,088,740 lb. copper, 28,906 oz. gold, 263,721 oz. silver. Net cost productions, 14·145 c. per lb., or, allowing for gold and silver and miscellaneous income in Utah, 12·366 c. per lb. copper. Net income from all sources, including adjustment of treating charges, $8,252,395. Ore reserves based on previous calculations, and deducting ore mined during the year, were at Dec. 31, 1919, 368,501,300 tons, averaging 1·37 per cent. copper.

TRIPLEX SAFETY GLASS.—The following additions have recently been made to the board: Mr. C. C. Hatry, managing director, Commercial Bank of London, Ltd., director of the following: British Glass Industries, Ltd., British Window Glass Co., Ltd., Leyland Motors, Ltd., Agricultural Industries, Ltd., C. A. Vandervell & Co.; Sir Francis Towle, director of the following: British Glass Industries, Ltd., British Window Glass Co., Ltd., W. Dennis & Sons, Ltd., Kent Portland Cement Co., Ltd., Webb's Crystal Glass Co., Ltd.; Mr. P. J Mitchell, managing director, British Window Glass Co., Ltd., director of the following: British Glass Industries, Ltd., Colonial & Foreign Glass Industries, Ltd.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Companies Winding Up Voluntarily

SWISS CELLULOID CO., LTD.—Creditors' claims on or before August 1, to the Liquidator, E. Norton, 3, Crosby Square, E.C.

TOLHURSTS CEMENT WORKS, LTD.—Liquidator, J. G. Wilson, 4, Lloyd's Avenue, London, E.C.

CHORLEY BLEACHING CO., LTD.—A meeting of creditors will be held at 36, Brazennose Street, Manchester, on June 14, at 11.15 a.m. This notice is given in accordance with the provisions of the Act. All creditors have been or will be paid in full. Creditors' claims on or before June 26, addressed to "The Liquidators of the Chorley Bleach Co., Ltd," at the above address. A. Reid and C. R. Lyoner, Liquidators.

Notice of Intended Dividend

SMITH, HERBERT ALDERSON, 8, Boundary Road, Leicester, manufacturing chemist, June 9. Trustee, E. Barlow, Official Receiver, 1, Berridge Street, Leicester.

Liquidator's Notice

VIKING OILFIELDS CO., LTD.—A meeting of creditors will be held at 1, Draper's Gardens, Throgmorton Avenue, London, E.C., on Friday, June 11, at 12 noon. Creditors, claims on or before June 30 to the Liquidator, H. Thomas, 170, Winchester House, Old Broad Street, London.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

NOBLE'S DRUG STORES, LTD., 2, Well Street, Cable Street, London, E. £11 12s. April 16.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

BLEACHERS' ASSOCIATION, LTD., MANCHESTER.—Registered May 18, mortgage or charge (supplemental to mortgage dated September 3, 1912) increasing rate of interest payable on £50,000 outstanding. *£2,250,000, £100,000, £85,000, £120,000. July 3, 1919.

BRITISH VEGETABLE OIL EXTRACTION CORPORATION, LTD., LONDON, E.C.—Registered May 18, charge securing all moneys due or to become due from the company to Wm. P. Bonbright & Co., George Street, Mansion House, E.C.; charged on all raw materials, produce manufactured, barrels, boxes, bags, sacks, book debts, &c. *£205,800. September 9, 1919.

COMMERCIAL SALT CO., LTD., LONDON, E.C.—Registered May 20. £11,900 2nd debentures to Property Debenture Corporation, Ltd., 9 and 10, Pancras Lane, E.C.; general charge. *£6,350. January 14, 1920.

GLOBE GLASS WORKS, LTD., LONDON, W.C.—Registered May 21. £2,500 (not ex.) charge, to Lloyds Bank, Ltd.; charged on 417, Old Ford Road, E. *Nil. December 31, 1919.

PLASTIC CEMENTS & FIBRASTIC, LTD., LONDON, S.W.—Registered May 19. £20,800 debentures, to Capt. C. W. Firebrace, Frensham Place, Farnham (Surrey); charged on factory at South Fambridge (Essex), subject to mortgage, dated May 20, 1919, also general charge. *Nil, December 16, 1919.